Indira Gandhi National Open University
School of Sciences

MGG-004

POPULATION AND SETTLEMENT GEOGRAPHY

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GLOSSARY

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POPULATION AND SETTLEMENT GEOGRAPHY

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BLOCK 3: EVOLUTION AND GROWTH OF HUMAN SETTLEMENT

The study of settlements in the discipline of Geography includes their location, size and growth as well as their relationships with the natural landscape. It also involves the study of their internal structure, external form and areal arrangements. Besides, the historical background and the economic and cultural conditions of the settlements are also included in the study of Settlement Geography. Like previous two Blocks, this Block is also divided into four Units that deal with the diverse aspects of settlements as memtioned above. Let us discuss each unit briefly.

Unit 9: Nature and Scope of Settlement Geography

In this unit, we will learn about how settlement geography has been defined by various scholars. We will also discuss its distinctive nature, scope and relevance. An attempt has been made to trace how and where this sub-discipline developed and the scholars who were instrumental in its development. Finally a brief description about the data sources for the geographical studies of settlements is also presented.

Unit 10: Evolution and Growth of Human Settlements

In this unit, an attempt has been made to find out as to how the process of the creation of human settlements was initiated. how human settlements developed over time, what principles determine their creation, which factors are considered while choosing the location of any settlement, what are the bases on which human settlements may be classified and the theories of their origin and evolution.

Unit 11: Spatial Distribution of Human Settlements

In this unit, we will learn about distribution of human settlements – both rural and urban. We will discuss the spatial and temporal trends in size and growth of human settlements. We will also discuss a few relevant Theoretical Models and associated empirical findings.

Unit 12: Functional Classification of Human Settlements

in this unit, we shall try to focus on the different empirical and theoretical models developed by various scholars to functionally classify settlements or precisely towns and villages. We shall also discuss about the functional classification and typology of urban centres and villages separately. Finally, we shall discuss the functional structure of towns in India.

Our best wishes are always with you to complete this course successfully.

UNIT 9

NATURE AND SCOPE OF SETTLEMENT GEOGRAPHY

Structure

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Nature of Settlement Geography
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9.1 INTRODUCTION

A human settlement simply means a place of dwelling or a place of permanent residence. It may range from a single house in a remote area to a megalopolis. The dictionary meaning of a settlement is, an assemblage of persons settled in a locality. It basically denotes an area of interaction of a given group of people and involves residential, social and economic activities. Thus, a settlement is a spatial unit, characterised by its degree of permanence, habitation and interaction. According to the United Nations' Declaration on Human Settlements (1976), "human settlements means the totality of the human community—whether city, town or village—with all the social, material, organizational, spiritual and cultural elements that sustain it."

So far as the study of settlements is concerned, it includes their location, size and growth as well as their relationships with the natural landscape. At the same time, it also involves the study of their internal structure, external form and areal arrangement. Besides, the historical background and the economic and cultural conditions of the settlements are also included in the study of settlements.

Chandreyi Banerjee

Now geography deals with all the features on the earth's surface, be it natural or man-made. Accordingly, there are two distinct branches of geography—physical and human. Settlement Geography as a major sub-field of human geography thus essentially studies that part of the earth's surface that are inhabited by humans. But defining settlement geography in this way may be over simplistic. Moreover, to have a proper understanding of the subject, it is necessary to understand its nature, scope and relevance in current times and how it evolved over time.

In this unit, we will learn about how settlement geography has been defined by various scholars in section 9.2. In the Section 9.3 we will discuss its distinctive nature, scope and relevance. How and where this sub-discipline developed and the scholars who were instrumental in its development was discussed in the Section 9.4. Finally in the Section 9.5, an attempt has been made to describe various data sources available for the geographical studies of settlements.

Expected Learning Outcomes

After studying this unit, you should be able to:

- Define Settlement Geography;
- Describe nature, scope and relevance of Settlement Geography;
- Explain the evolution of Settlement Geography over time;
- Describe various data sources for the study of Settlement Geography.

9.2 DEFINITION OF SETTLEMENT GEOGRAPHY

To begin with, let us first discuss as to how settlement geography is defined. This will later help to understand the nature and scope of the subject. Since Human Geography branches into the studies of the economic and social activities of humans, so settlement geography as a branch of Human Geography is a part of the social aspects of human geography.

On the basis of his pioneering work, German geographer, **Otto Schluter** is regarded as the ***"Father of Settlement Geography."*** Schluter included the following heads in the study of settlement geography:

- Genesis and growth of settlements.
- Location and size of settlements.
- Relationship of settlements with the surrounding natural landscape.
- Internal structure and external appearance of the settlements.
- Spatial organisation of the settlements.
- Historical, economic and socio-cultural conditions of the settlements.

Schluter put more emphasis on human activities in the realm of settlements than humans themselves. In the views of Schluter, settlement geography focused on the residential relationship of humans to land.

According to him, the group of houses in villages and towns rather than a single house and the entire settlement system instead of the location and morphology of a single village or town were more important in settlement

Box 9.1: O. Schluter

Otto Schluter was a German geographer. He was born in Witten, Germany on November 12, 1872. From 1911 until his death on October 12, 1959, he remained a Professor of Geography at the University of Halle (Saale) in Germany. He became the Father of Settlement Geography through his important and pioneering work in 1899 titled ***"Bemerkungen zur Siedlung Geographie." (Remark on the Geography of Settlements)*** After his death, *The Geography of Settlements in Central Europe"* presented by him was published in three volumes in 1952, 1953 and 1958.

studies. Following his ideas of the study of settlements, the subject may be defined as that branch of human geography which deals with the orderly description and interpretation of the genesis, growth, location and pattern of distribution as well as the functional and areal organisations of human settlements on the earth's surface. However, just like the definition of the parent discipline (that is, geography), the definition of settlement geography also exhibits a great deal of variations as different scholars have defined the subject in their own different ways.

According to **C.F. Kohn** (1954), "settlement geography has to do with the facilities men built in the process of occupying an area."

In the words of **R.L. Singh** (1961), "settlement geography deals with the facilities (houses and roads) built in the human occupancy of the land and their groupings." Much later, Singh and his associates in 1975 defined settlement geography as dealing with the orderly description and interpretation of the process, patterning, function and environment over the earth's surface.

In 1965, **K.H. Stone** defined settlement geography as the description and analysis of the distribution of buildings by which people attach themselves to the land.

A year later, referring to Stone, **T.G. Jordan** defined settlement geography as the study of the form of the cultural landscape. Jordan was of the opinion that settlement geography does not limit itself exclusively to the spatial distribution of settlements but also investigates the structures, processes and interactions between settlements and its environment (be it natural or social) which produce them.

In the views of the, **S.P. Chatterjee** (1969), settlement geography deals with the size, form, functions of settlements built up by man and traces their historic growth.

Following a similar approach, **R.C. Sharma** (1969) defined settlement geography as aiming to study the size, form, functions and regional associations of human settlements along with tracing their growth and pattern of distribution.

According to **G.S. Gosal** (1972), "settlement geography is concerned with the spatial variation on the earth's surface."

What is evident from the above is that, the process, form and functions constitute the basic elements of the definitions of settlement geography. Since most of the scholars have derived their ideas from their predecessors, some of the definitions might appear to be the repetition of similar views.

More recently, the study of settlements has become more holistic to involve human interactions with their physical and ecological world. This is basically an outcome of the growing concern for sustainability. The purpose behind this is to project future settlement development and contribute to the creation of sustainable human-environment systems.

SAQ I

a) Who is regarded as the Father of Settlement Geography?
b) What are the basic elements of the definition of settlement geography?

9.3 NATURE AND SCOPE OF SETTLEMENT GEOGRAPHY

Now that we have gone through some major definitions of settlement geography given by the most eminent scholars of the field, it may be easier for us to understand the nature and scope of the subject.

9.3.1 Nature of Settlement Geography

The study of settlement geography initially followed a descriptive approach. But soon, a need arose for more in-depth studies. The emphasis on locational aspect paved the way for a more comprehensive perspective. Interaction amongst the settlements led to the concept of settlement systems. With the study of population characteristics and distribution, ecological studies also assumed importance while for planning, morphological studies were relied upon. Thus, the study of settlement geography came forth with *three* facets:

1. ***The settlement as a unit*****:** This deals with the own internal organisation of settlements like its morphology, socio-economic structure or its relation with the physical environment.
2. ***The settlement as a part of a system*****:** This is mainly the study of the total settlement system that is, the interconnectedness of the different settlement units, this therefore, involves ranking, hierarchy and classification of settlements.
3. ***The settlement as a part of the landscape*****:** This deals with the impact of the settlement on the entire surrounding region and how it changes the nature of land use over time and how the planning process should be altered accordingly.

Hence, settlement geography is that branch of geographical knowledge that is concerned with the variations in the spatial distribution of settlements and their groupings on all scales in the present as well as in the past and future. It involves the description, classification, analysis, synthesis and explanation of networks, linkages, surfaces and hierarchies as phenomena on space accessible to humans and their technology.

Settlement Geography has some distinctive characteristics. As the name suggests, ***settlement geography is settlement centric geography.*** It is obvious since human settlements constitute the central focus of settlement geography be it urban settlements or rural settlements. However, interestingly owing to the influence of the American school of thought in which urban settlements come under the purview of a separate sub-branch of geography known as urban geography, settlement geography is sometimes faced with dichotomous views of the scholars who prefer to constrict its study to rural

settlements only and thus it is ***treated as coterminous with rural settlement geography***. To study any settlement, multiple aspects needs to be considered such as its morphology, plan, network system, individual buildings, physical location, socio-economic settings etc. Though most of these aspects are arguably geographical in nature, they often overlap into the domain of other disciplines such as economics, sociology, history and architecture. No doubt, most of the models and paradigms of settlement geography are based on the principles of economics and sociology. Therefore, ***settlement geography is also a social science*** concerned with the social aspects of human activities. The question then arises that what is the role of the geographer in settlement studies? The geographer adds the essential spatial dimension to such studies keeping in mind that the concept of *'space'* is the central theme of any geographical discourse. The importance of location and distribution patterns in settlement studies is proof to this. Hence, ***settlement geography is primarily a spatial science***. Finally ***settlement geography is a systematic science*** as well because it attempts to undertake a systematic analysis of human settlements by taking into account their origin, growth, types, characteristics, functional classification etc.

9.3.2 Scope of Settlement Geography

In spite of having several available literatures, settlement geography lacks a strong methodological background and so, the approach to the actual study is still less definite. Like the parent discipline, the study of settlement geography has undergone changing modes of analysis from time to time. As mentioned earlier, the subject started with a descriptive approach based on the collation of facts and information. Eventually settlement geography adopted two alternate approaches—a *positivist approach* and a *humanistic approach.* With the adoption of the positivist-empiricist-scientific approach in the early 19th century followed by a quantitative revolution in geography, a lot of emphasis was given on the collection of detailed socio-economic data with the help of questionnaires and schedules. The reason was to find the cause and effect relationship in all areas. This led to the usage of advanced statistical techniques and computer-aided data analysis. The settlement geographer started to increasingly depend on such techniques and models for his interpretations. In contradiction to this, was the humanistic-structuralist approach which also found favour with the radical geographers whose main concern was with social justice and equality. The humanistic approach rejected the positivist methods on the ground that humans were not mere responder to certain stimuli. They stressed on the idea that any observation is dependent on the ideas and values of the observer. Hence, new concepts such as behaviourial environment, social space, mental maps etc. were introduced. This led to the usage of qualitative subjective information like oral history, folklore etc. for analysis. Mental maps of settlements drawn by their inhabitants based on their perception illustrated the fact that how the idea of the same settlement differed from person to person. However, at present settlement geographers use a synthesis approach based on the combination of both quantitative and qualitative techniques.

So far as the subject matter of settlement geography is concerned, it may be broadly grouped under the following heads:

1. The genesis and growth of settlements that includes the settling process of humans, site and situation, tenancy, sequent occupancy, settlement diffusion etc.

2. The morphology of settlements which may again be classified into:

   a. *Physical Morphology* i.e., the internal structure as well as the external forms involving both horizontal and vertical dimensions.
   b. *Functional Morphology* which means the functional zones and delimitation and the hierarchy of the settlements.
   c. *Social Morphology* meaning the social, economic and demographic composition of the settlements such as religion, caste, educational level, occupational structure, land ownership, age-sex structure, migration etc.

3. The spatial pattern of the settlements like the location, distribution, size and spacing etc.

4. The classification of settlements into rural and urban on the basis of their origin, location, size, functions, house density, stages of growth etc.

5. Identification of the problems and consequent planning of the settlements be it urban or rural.

Broadly speaking, the scope of settlement geography is to acquaint us with the spatial and structural aspects of human settlements under varied environmental conditions. In today's world the *relevance* of the subject is to connect us to the concepts of sustainability, livability, safety, resilience, availability, affordability and accessibility. All these concepts attempt to find out as to how life will be with increasing population on a limited habitable world. Accordingly the ideas of smart cities and smart villages are gradually assuming significance as safe, secure and sustainable human habitations.

SAQ 2

a) What are the two alternate approaches in the study of settlement geography?
b) What are three facets in the study of settlement geography?

After discussing definitions, nature and scope of Settlement Geography, you might be eager to know the development of this branch of geography all over the world. In the below given section, contribution made by German, French and other European, American and Indian scholars are presented.

9.4 DEVELOPMENT OF SETTLEMENT GEOGRAPHY

Though some traces of settlement geography may be found in Ritter's work 'Erdkunde' (1800), but during the time of Ritter and his contemporary Humboldt more emphasis was placed on natural phenomena rather than human activities. In the 18th century, geography had only three broad divisions—mathematical, physical and historical or political. By the 19th

century, the domain of geography took a more definite shape. Still, no detailed micro level studies were undertaken. From the beginning of the 20th century, the scope of geography broadened further and the subject was considered as the science of human ecology or the science of relations.

One of the earliest contributions on rural settlements was made by the German scholar August Meitzen in 1895. Based on ethnographic studies, Meitzen propounded a racial theory for the origin of rural settlements and classified them as agglomerated (haufendorf) and isolated (einzelhold).

Initially settlement geography was contained within the ambit of cultural geography since human settlements constituted an important aspect of the cultural landscape. It was the German geographer, O. Schluter who established settlement geography as an independent sub-branch of human geography in 1899. His contribution has already been discussed in detail in the section “Nature of Settlement Geography” in this unit. Following Schluter, several scholars from Germany, France, Britain, Sweden, America and many other countries were instrumental in the development of the discipline.

9.4.1 German Contribution

After Schluter, a commendable effort towards the development of settlement geography was made by **Robert Gradmann** during 1914. In a research series on geography edited by him, he made valuable contributions regarding rural as well as urban settlements. According to Gradmann, rural settlements had four important features—residence, village form, house and field. His assertion was that the field system and the types of settlements were fundamentally related to each other. Gradmann also postulated a theory regarding the evolution of settlements in 1926.

R. Martiny in 1928 made significant contributions in the field of rural settlements and concluded that the field patterns, house types and morphology were inherent of rural settlements. His attempt to study the 60 distinct forms of villages in Germany is noteworthy.

In 1933, the Central Place Theory was postulated by the eminent German economist and economic geographer, **Walter Christaller** to study the central places in southern Germany. The theory was later modified by August Losch and other scholars. Christaller systematically analysed the size, spacing and hierarchy of the central places in a given region.

9.4.2 French Contribution

After the development of settlement geography in Germany, the French geographers in the early 20th century became increasingly interested in the study of rural settlements that constituted distinctive phenomena of the cultural landscape. Their main interest was in house forms and building materials of the rural settlements.

Prior to this, eminent French geographer of his time, **Paul Vidal de la Blache** who took human geography to new heights, elaborated on house building materials in his classic work ***‘Principles de Geographie Humaine.’***

His brilliant disciple, **Jean Brunhes** put settlements on top priority in the subject matter of human geography. Not only did he classify the houses in Europe on the basis of building materials but also showed their distribution. He was of the opinion that houses and highways were the two important elements of the unproductive occupation of soil.

Another eminent disciple of Blache, **Albert Demangeon** overshadowed the French school of thought for almost two decades (1920-1940). He was greatly interested in the study of the concentration and dispersal of rural settlements and agrarian structure in small regions called pays in France. Demangeon carried out extensive studies on field ownership, house types, building materials and distribution of rural settlements. In his article ***'Habitation Rurale en France'*** published in **Annales** in 1920, he presented a study of the regional variations of the farmsteads. His other article titled ***'L Habitat Rurale'*** published in the same journal was a pioneer study on the distribution of the varied forms of the nucleated settlements in rural areas across the world.

Raoul Blanchard, a professor of geography at Grenoble published several studies on the urban geography of the various important cities of France.

The outstanding work of **Jean Gottman** titled ***'Megalopolis or the Urbanization of the North-Eastern Seaboard'*** was published in **'Economic Geography'** in 1957. The term *'megalopolis'* was introduced by him to mean the continuous stretch of urban and suburban areas extending from little north of Boston to little south of Washington.

9.4.3 Contribution of Other European Countries

Lefevre, a disciple of Demangeon is credited for the development of settlement geography in Belgium. She placed great emphasis on the origin, distribution, type, function, age, architecture, morphology and development of settlements.

Ahlman (1928) in Scandinavia published a paper in the journal **'Geographical Review'** titled ***'The Geographical Study of Settlements.'*** In this, he emphasized on the process and suggested that the study of the form, grouping, location and development of settlements should be done through their evolutionary stages.

In Finland, **J.G. Grano** (1937) attempted to study urban and rural settlements separately. He delimited different settlement regions of Finland on the basis of location and shape (pattern).

J. Kral (1951) of Czechoslovakia made significant contributions in describing the types and classifying the settlements.

In 1968, **C.A Doxiadis** of Greece attempted to develop a new and independent branch of the science of human settlements called ***'Ekistics.'***

Box 9.2: Ekistics

Ekistics is the science of human settlements which studies the underlying principles in the development of settlements as well as their evolution through time. It was propounded by **Constantinos Apostolou Doxiadis.**

Doxiadis conceived of human settlements as a complex system constituted of five elements—nature, humans, society, shells (i.e. building and houses) and networks. It is a system comprising of both natural and human-made elements having several aspects—social, economic, political, technological and cultural.

In Britain several outstanding studies were made mostly in the field of urban settlements. **Patrick Geddes** explained the concept of ***'conurbation'*** in his famous book ***'Cities in Evolution'*** (1915). On the basis of technological development, Geddes classified cities into three broad categories—eotechnic, palaeotechnic and neotechnic.

Louis Mumford made significant contribution in the study of urban settlements through his books ***'Culture of Cities'*** (1938) and ***'The City in History'*** (1961).

Similarly, the contributions of **A.E Smailes** and **R.E Dickinson** are also worth mentioning. Smailes' book ***'Geography of Towns'*** (1953) and two books of Dickinson, namely, ***'City Region and Regionalism'*** (1947) and ***'The West European City'*** (1968) are classic works in the field of urban settlement geography.

9.4.4 American Contribution

C.F John is credited to encourage the study of settlement geography in USA especially the rural settlements. He expressed his views in his article ***'The Use of Aerial Photographs in the Geographic Analysis of Rural Settlements'*** (1951) that settlement geography deals functionally with the character and arrangements of human activities. Another article of Jones on settlement geography was published in a book edited by Jones himself along with P.E James titled ***'American Geography: Inventory and Prospects.'***

In America, significant studies were undertaken by K.H Stone especially for rural settlements. He put great emphasis on the description and analysis of the distribution of buildings. His paper titled ***'Multiple Scale Classification of Rural Settlement Geography'*** (1968) provided altogether new thoughts in the study of rural settlements. However, his views were challenged by **T.G Jordan** who was of the opinion that Stone's use of words like 'distribution' and 'buildings' restrict the scope of the discipline. Jordon defined settlement geography as the study of the form of the cultural landscape. He equated 'form' with the morphology of the settlement be it the vertical arrangements and dimension, the horizontal arrangements and dimensions or the material composition.

The American geographers made commendable contributions in the field of urban settlements. In 1939, the concept of the ***'Primate City'*** was introduced by **Mark Jefferson**. Following him, **G.K Zipf** propounded the ***'Rank-Size Rule'*** in 1941. With the aid of statistical techniques, functional classification of

American cities was presented by **C.D Harris** (1941) and **H.J Nelson** (1955). Significant models of urban morphology also came to the fore like the ***'Concentric Zone Theory'*** by **E.W Burgess** (1923), the ***'Sector Theory'*** by **Homer Hoyt** (1939) or the ***'Multiple Nuclei Theory'*** by **C.D Harris and E.L Ullman** (1945). The concept of ***'rural-urban fringe'*** was also well-explained by G.S Wehrwein.

9.4.5 Indian Contribution

Modern geography made a late start in India. So till 1940, no significant contributions were made in the field of settlement geography. Major contributions to settlement geography came from Varanasi. **R.L Singh's** paper ***'Meaning, Objective and Scope of Settlement Geography'*** published in the **National Geographical Journal of India** in 1961 aroused a great deal of interest for settlement geography among young geographers. Prior to this, his work, ***'Banaras: A Study in Urban Geography'*** (1955) may be regarded as a pioneering work of urban geography in India. The two volumes edited by R.L Singh and associates titled ***'Rural Settlement in Monsoon Asia'*** (1972) and the ***'Geographic Pattern of Rural Settlements'*** (1976) provided a multidimensional and multidisciplinary approach to the study of rural settlement geography. The joint venture by ***R.L Singh and Rana P.B Singh*** in 1975 opened up new aspects regarding morphology, shape analysis and spatio-temporal distribution of rural settlements in India.

In 1968, a study of the territorial basis of medieval towns and villages in Eastern Uttar Pradesh was presented by **K.N Singh**.

S.P Chatterjee asserted on the size, form, function and histogenesis of the human settlements. **A.B Mukherjee** attempted to analyse empirical attributes of rural settlements in the Siwalik Hill Tracts of Punjab as well as spacing of villages in the Ganga-Yamuna Doab region. During 1960s, several researches were conducted to delimit the umland or city region of different cities of India. This included the studies of **Ujagir Singh, A.B Mukherjee, R.L Dwivedi, K.R Dixit** and many others. Studies on urbanisation process and urban growth in India were done by scholars like **S. Nangia, A. Bose** and **S.M Alam**. In the 1970s and 1980s, several doctoral theses were presented on the rural settlements of the Indian Desert, Chotanagpur, or Lower Ganga-Yamuna Doab or Delhi Region by **R.C Sharma, A. Prasad, R.C Tiwari** and **Sudesh Nangia** respectively

SAQ 3

Name the concepts given by different scholars:

a) Jean Gottman

b) Patrick Geddes

c) Mark Jefferson

d) Homer Hoyt.

9.5 SOURCES OF DATA FOR THE STUDY OF SETTLEMENT GEOGRAPHY

Human settlements play a key role in understanding social processes and interaction between humans and the natural environment. For any study in settlement geography, geographers have to rely on both primary as well as secondary sources of data.

Primary data is derived from field work and is best for the analysis of comparatively smaller areas at any given point of time. This mostly involves the participatory survey method and interview method in which the perception of the inhabitants are recorded regarding the evolution of the settlements or their size, form, structure, pattern etc. This is in coherence with the qualitative techniques about which we have discussed earlier in this unit in which, mental maps constitute an integral part. To study the histogenesis of any settlement, one may rely upon the information derived from oral history of their inhabitants. Different sources of available literature for the area may also provide the necessary information required. At present, even digitised historical maps are available for retrospective analysis. However, the existing historical information is restricted to time.

Since the settlement geographers also resort to advanced statistical techniques hence, reliance on secondary data sources is also necessary. The census data of any country acquired at regular intervals—decennial or quinquennial—is perhaps the most extensive data source for this. In addition, one may take recourse to statistical yearbooks for any kind of information on the social economy of the settlements.

Large scale topographical maps are yet another effective data source for settlement studies. Also known as general purpose maps, they depict both natural and human-made features of any area in detail. In India, such maps are produced by the Survey of India.

As the use of computer-aided data is progressively coming into use, new methods are devised to map settlements using vector data from satellite imageries and other earth observation data. These are derived through remote sensing techniques. The high resolution satellite images provide detailed information regarding the building characteristics, layouts and expansion of the settlements. They also produce land cover databases. The National Land Cover Database (NLCD), the Gridded Population of the World (GPW), Global Rural-Urban Mapping Project (GRUMP), the Global Urban Footprint (GUF) or the Global Human Settlement Layer (GHSL) provides spatial information regarding human presence in this planet over time on global scales.

Therefore, the sources of data for any study of settlement geography can be derived from the following sources:

1. Primary Data from field surveys.
2. Secondary Data for Qualitative Techniques
   a. oral history b. available historical literature and maps.

3. Secondary Data for Quantitative Techniques
    a. Census
    b. Statistical Yearbooks
    c. Topographical Maps
    d. Satellite Imageries.

SAQ 4

a) What are the two sources of data for the study of settlement geography?
b) What kind of data on Settlements are provided by the high resolution Satellite images?

9.6 SUMMARY

A settlement is a place of residence. It is a spatial unit characterized by its degree of permanence, habitation and interaction. The study of settlements includes their location, size and growth as well as their relationships with the natural landscape. At the same time, it also involves the study of their internal structure, external form and areal arrangement. Besides, the historical background and the economic and cultural conditions of the settlements are also included in the study of settlements. The discipline of geography has two distinct branches—physical and human. Settlement Geography as a major sub-field of human geography thus essentially studies that part of the earth's surface that are inhabited by humans.

The domain of settlement geography has been defined in different ways by various scholars but, the process, form and functions constitute the basic elements of the definitions of settlement geography. The study of settlement geography has three facets—the settlement as a unit, the settlement as a part of a system and the settlement as a part of the landscape. Settlement geography has some distinctive characteristics. Human settlements, whether urban or rural constitute the central focus of settlement geography. Settlement geography is essentially a systematic spatial and social science.

The study of settlement geography was initiated with a descriptive approach but soon it adopted two alternate approaches in geography—a positivist-empiricist-scientific approach and a humanistic approach. The subject matter of the discipline includes the genesis and growth of settlements, the morphology of settlement, spatial pattern of the settlements, their classification, associated problems and consequent planning. In today's world the *relevance* of the subject is to connect us to the concepts of sustainability, livability, safety, resilience, availability, affordability and accessibility.

Eminent German geographer, *Otto Schluter* is regarded as the *Father of Settlement Geography*. The German, French, British and American geographers have been most instrumental in the development of the discipline as an independent sub-branch of human geography through their contributions in the fields of both urban and rural settlements. In India, settlement geography had a late start. Major contributions came from

Varanasi. There is another branch of knowledge propounded by Doxiadis known as *'ekistics'* which is the science of human settlements.

For any study in settlement geography, geographers use a synthesis approach and have to rely on both primary as well as secondary sources of data. The primary data are obtained directly from the field through participatory survey method and interview method. The secondary data are derived from other sources for both qualitative and quantitative analysis. They include oral history, available literature, historical maps, census data, statistical yearbooks, topographical maps, satellite imageries and so on.

9.7 TERMINAL QUESTIONS

1. Explain briefly the domains of settlement geography propounded by Schluter?
2. Discuss the distinctive nature of settlement geography?
3. Elaborate on the German contributions to the development of settlement geography.
4. Describe the secondary sources of data used in the study of settlement geography?

9.8 ANSWERS

Self-Assessment Questions (SAQ)

1. a) Otto Schluter is regarded as the Father of Settlement Geography.
   b) Process, form and functions constitute the basic elements of the definitions of settlement geography.
2. a) Positivist-empiricist-scientific approach and humanistic approach.
   b) The study of settlement geography has three facets—the settlement as a unit, the settlement as a part of a system and the settlement as a part of the landscape.
3. a) Megalopolis b) Conurbation c) Primate City d) Sector Theory
4. For any study in settlement geography, geographers have to rely on both primary as well as secondary sources of data.

Terminal Questions

1. Schluter included the following heads in the study of settlement geography: (i) Genesis and growth of settlements; (ii) Location and size of settlements; (iii) Relationship of settlements with the surrounding natural landscape; (iv) Internal structure and external appearance of the settlements; (v) Spatial organisation of the settlements; and (v) Historical, economic and socio-cultural conditions of the settlements.
2. Settlement Geography has some distinctive characteristics. Settlement geography is settlement centric geography. It is obvious since human settlements constitute the central focus of settlement geography be it urban settlements or rural settlements. However, settlement geography is sometimes faced with dichotomous views of the scholars who prefer

to constrict its study to rural settlements only and thus it is treated as coterminous with rural settlement geography. Settlement geography often overlaps into the domain of other disciplines such as economics, sociology, history and architecture. Most of the models and paradigms of settlement geography are based on the principles of economics and sociology. Therefore, settlement geography is also a social science concerned with the social aspects of human activities. The concept of 'space' is the central theme of any geographical discourse. Hence, settlement geography is primarily a spatial science focusing on location and distribution pattern of settlements. Finally settlement geography is a systematic science as well because it attempts to undertake a systematic analysis of human settlements by taking into account their origin, growth, types, characteristics, functional classification etc.

3. One of the earliest contributions on rural settlements was made by the German scholar August Meitzen in 1895. Meitzen propounded a racial theory for the origin of rural settlements and classified them as agglomerated and isolated. O. Schluter established settlement geography as an independent sub-branch of human geography in 1899. After Schluter, a commendable effort towards the development of settlement geography was made by Robert Gradmann during 1914. He made valuable contributions regarding rural as well as urban settlements. R. Martiny in 1928 made significant contributions in the field of rural settlements and concluded that the field patterns, house types and morphology were inherent of rural settlements. In 1933, the Central Place Theory was postulated by Walter Christaller to study the central places in southern Germany. The theory was later modified by August Losch and other scholars.
4. For any study in settlement geography, geographers use a synthesis approach and have to rely on both primary as well as secondary sources of data. The secondary data are derived from other sources for both qualitative and quantitative analysis. They include oral history, available literature, historical maps, census data, statistical yearbooks, topographical maps, satellite imageries and so on.

9.9 REFERENCES AND FURTHER READING

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Web Links

1. https://ghsl.jrc.ec.europa.eu/
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UNIT 10

EVOLUTION AND GROWTH OF HUMAN SETTLEMENTS

Structure

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10.1 INTRODUCTION

If we simply go with the word settlement, then it may be said that it is derived from the word ‘settle’ meaning to establish or become established in more or less permanent way of life. A settlement is fixed to a point of space and hence has a definite location and identity. According to Perpillou, a settlement is a manifestation of human adaptation to the environment. In other words, a settlement may refer to a space-bound social organisation that is part of the cultural landscape superimposed on the natural landscape. Gradually people feel attached to a place, identify themselves with that place and develop a sentimental attachment to it---a phenomenon that is known as ‘topophilia.’

Information regarding the place and time of first human settlements is still very obscure. Primitive humans lived in caves, treetops and fed themselves

on fruits, roots, animals and water directly collected from nature. Eventually protection from climatic variations and wild animals turned them to search for shelters and the need for mutual help led them to live in groups. This gave rise to villages or small settlements. The spatial relationships between and among the settlements gave rise to settlement systems. However, the creation of each settlement is believed to have certain underlying principles. Moreover, any settlement needs some initial advantages favourable for living and to grow in size.

In this unit therefore, we shall try to find out the process of the creation of human settlements and evolution of human settlements over time in Section 10.2. In section 10.3, a brief discussion was made about site and situation of human settlements. A detailed discussion on classification of human settlements on the basis of size, forms, shapes and functions were presented in Section 10.4. In the concluding section i.e. Section 10.5, the theories related to origin and evolution of human settlements were discussed.

Expected Learning Outcomes

After studying this unit, you should be able to:

- Describe the origin and evolution of human settlements over time;
- Discuss the principles and factors governing the development of settlements;
- Explain the classification of settlements on the basis of size, forms, types and functions; and
- Analyse various theories related to the origin and evolution of human settlements.

10.2 ORIGIN AND GROWTH OF HUMAN SETTLEMENTS

In the previous unit, we have already mentioned about ***'ekistics,'*** being propounded by **C.A Doxiadis** as the science of human settlements that principally studies the evolution of human settlements through time as well as the principles behind the creation of settlements. In this section, we shall discuss these principles in detail and try to find out as to how the inception of human settlements took place and they evolved over time.

10.2.1 Underlying Principles in the Creation of Human Settlements

Human settlements may be conceived as a complex whole comprising of natural and human-made subsystems. These subsystems are---the natural environment, the built environment, humans themselves, society and the government. Doxiadis has named these elements as nature, shells, anthropos, society and networks respectively (Fig. 10.1)

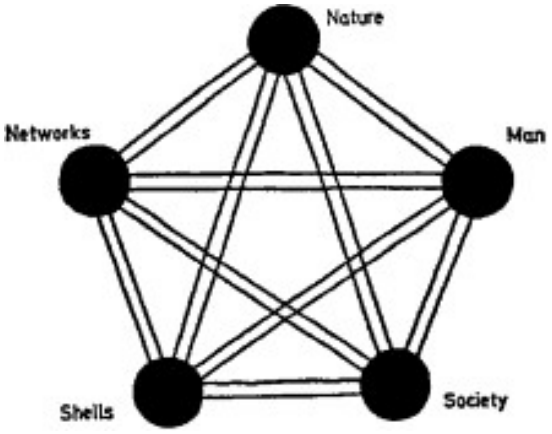

Fig. 10.1: Doxiadis' Concept of Human Settlements

Since these sub-systems are in a continuous state of change, settlement systems also undergo consequent changes.

As human beings build homes or create settlements, they have certain considerations like safety and security, survival and propagation of their collective groups. Subsequently, these considerations develop into principles which are listed below:

The ***First Principle*** is the *maximisation of human being's potential contact* with natural elements (like water, trees etc.), with other humans and with human-made elements (like buildings, roads etc.).

The ***Second Principle*** is the *minimisation of efforts* required by humans to achieve their actual and potential contacts. Accordingly, humans give shape to such structures or select such routes that require minimum efforts.

The ***Third Principle*** is regarding the *maximisation of the protective space* of humans. This means the selection of a comfortable distance from other people, animals or objects in the maintenance of their contacts.

The ***Fourth Principle*** is the *optimisation of the quality of human beings' relationship* with the five elements constituting the settlement system, that is, nature, other people, society, shells (buildings and houses) and networks. This principle leads to physiological and aesthetic order.

Finally, the ***Fifth Principle*** involves the *organisation of settlements* in such a way as to achieve an optimum synthesis of the above four principles. This is dependent on time and space as well as on human ability to create such synthesis.

Now that we are aware of the underlying principles determining the creation of human settlements, the questions that come in our mind is as to, how did the inception of human settlements take place and how did they evolve over time.

10.2.2 Origin and Growth of Human Settlements

Human settlements have been rightly defined as an organised colony of humans (R.L Singh, 1961) grouped together in clusters. Though the actual reasons behind the formation of human settlements are still not very clear, yet

the tendency of humans to settle in large community dwellings may be attributed to their gregarious nature.

Information regarding when and where the first settlements developed is still obscure and there are only conjectures about it, but as archaeological evidences suggests, one may say that the first human settlement developed in the Neolithic Period. Prior to that, primitive men lived as wanderers, moving from one place to another in search of food that was collected directly from nature. They did not possess the skills to construct buildings and stay in permanent dwellings. Whenever there was food shortage they moved to some new location.

Upto 10,000 B.C, humans lived in caves (Fig. 10.2) or treetops or tree houses (called *machaans* in India) or by rivers, lakes and springs. As the number of humans increased with time, their food requirements also increased and between 10,000 and 5,000 B.C, humans learnt the art of cultivating plants. This led them to stay in one place and easily procure food. Gradually human beings started settling near the fields they cultivated and built huts with locally available material such as mud, bamboo, thatch etc.

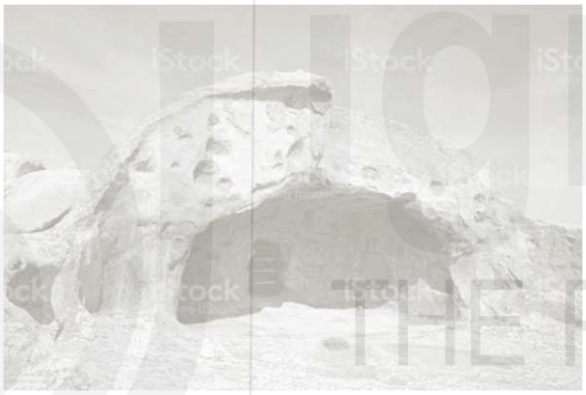

Fig. 10.2: Prehistoric Remains of Cave Dwelling

The development of the earliest settlements began to take shape in the Neolithic Period somewhere between 5,000 and 1,000 B.C with groups of houses built near the agricultural fields along with a shrine and a burial ground. This was the initiation of community dwellings when humans started organising themselves under some able leadership and stay in a place. However, as the fertility of the soil declined with successive cultivation, the place was abandoned and people migrated to some new location. Eventually, humans learnt to practice multiple cropping and the need to move from one place to the other was no longer required.

As humans acquired the skill to prepare manures, they could increase their food production. With increased food security movement from one place to another was no more needed and humans thus started settling down in one place preferably with some locational advantages be it moderate climate, abundance of water, fertile soil and so on (We shall more learn about this in the next section). This was the beginning of permanent settlement. Hence, some of the oldest settlements could be traced back along the river valleys in India, China, and Egypt that provided some of the best locations for human settlements with fertile lands, soft clay as building materials and the river itself as a means of transportation.

The earliest urban centres came into existence somewhat around the later part of the Neolithic Period. This was possible only when the early farmers could produce surplus food and some part of the population was freed from tilling the lands to engage themselves in non-agricultural works like hand manufacturing, trade and commerce etc. Subsequently, groups of specialised artisans, merchants, officials, priests etc., were created. These groups, along with a proportion of the agricultural community gathered themselves in close-knit societies to form some of the first towns of the world. These towns were mostly found in Egypt, Indus Valley, Mesopotamia (modern Iraq, Syria, Jordan and Israel) like Memphis and Thebes in Nile Valley, Mohenjodaro and Harappa in Indus Valley, Lagash and Nippur in Mesopotamia. Of course these towns had some locational advantages be it the river itself or the plain lands to facilitate the movement of wheeled vehicles. These towns not only had protective walls for defense but also places of worship and trade links with nearby farmlands or even distant places mainly for the procurement of copper.

With the advent of the Bronze Age, some new trading centres emerged which benefitted from sea trade through the Mediterranean Sea. Few caravan routes also developed in the desert oases of Syria in the margins of the Fertile Crescent (Mesopotamia) like Damascus.

But no other cultural zone in the third and second millennium B.C. in the world was as large as Mohenjodaro-Harappa. Both the cities stood like the twin capitals of a single empire. Each city of the Indus Valley civilization had its protected citadel towering above the rest of the city and contained a bath or tank, a granary and halls. The towns extended in an orderly manner along the watercourses showing a remarkable regularity in the arrangement of structures (streets and houses) and presented one of the oldest example of systematic town planning (Fig. 10.3).

The Greek and the Roman city-states appeared somewhat between 2,000 B.C. and 1,000 B.C. **Hippodamus** (Greek architect) advanced his theories of the art and science of city planning because of which he is known as the *'Father of City Planning.'* The Romans were great builders and technicians.

Fig. 10.3: Town Planning in Indus Valley Civilisation

They constructed bridges across rivers and aqueducts for water conveyances. With the fall of the Roman empire and the coming of the

Barbarians, the Dark Age commenced in Europe which led to the decline in the growth of cities.

The period between 1500 and 1750 A.D. i.e. the Renaissance Period witnessed considerable expansion of many cities in Europe that were already urbanised from beforehand. This was the time when there was tremendous growth of trade and few great cities towered over the rest as single rulers began to rule large tracts of land. The cities of Versailles, Nancy etc. bear testimony to this. They had straight wide avenues, grand palaces, art galleries, theatres and so on. Since trade flourished during this time, several port cities also developed such as Antwerp, Lisbon, and Amsterdam that controlled the Asiatic and Atlantic trades. London emerged as an important city with 7, 00,000 inhabitants since it was not only the capital of a great state but also a leading commercial centre.

Following the Industrial Revolution, there was a greater increase in the number and size of towns and the invention of rail transport favoured settlements to develop as hubs of communication.

Box 10.1: Sequential Growth of Human Settlements

If settlements of a region are considered to be part of a total system, then it is quite but obvious that growth at one point will be associated with decline in another. The evolution of settlements traces some kind of a sequential growth. Archaeologists claim to have excavated nine layers of city growth of Troy, Anatolia while Hindu mythology also describes the rise and fall of Dwarka, the capital of the Yadavas.

Drawing analogy from the Davisian theory of landscape evolution, **Griffith Taylor** attempted to explain that evolution of settlements may lead to its growth followed by decay and perhaps rejuvenation. Initially in the ***sub-infantile stage***, there is a town with ill-defined streets followed by the ***infantile stage*** in which there is a tendency of the bigger houses to be located near the margins but there is no clear-cut differentiation of functions. In the next stage, that is, the ***juvenile stage***, extensive commercial quarters develop somewhat at the centre of the town but still residential areas or any other functions are not properly demarcated. The next two stages of ***adolescence and early maturity*** exhibit clear differentiation of residential zones with only variation in degrees. The final stage is a ***mature*** town with separate commercial areas and different types of residential zones ranging from mansions to shacks.

Lewis Mumford conceived of a city rising through multiple stages to reach its evolutionary peak. Thereafter, it begins to decay. He identified three stages of growth followed by three stages of decay.

Eopolis: This is the rising village community.

Polis: This is the small market town that had the blend of traditional values as well as modern civic amenities.

Metropolis: This is the large city with a wide sphere of influence, a cosmopolitan population and specialised occupations.

Megalopolis: This stage marks the beginning of decline. This is a bloated city in which material wealth dominates life. In this, standardised products replace indigenous art, size dominates form and the evils of bureaucracy intensify.

Tyrannopolis: This as can be understood from the name is the tyrannical city in which good living is replaced by moral apathy and the economy fluctuates between expansion and depression.

Nekopolis: This is the city of the dead where overcrowding and degradation leads to famine, war etc., and the city finally decays.

SAQ I

a) Who is known as the Father of City Planning?
b) What is a Nekopolis?

10.3 SITE AND SITUATION OF SETTLEMENTS

While we discussed about the origin and growth of settlements in the previous section of this Unit, it was apparent that the location of settlements depended on certain favourable conditions and settlements preferred to be located where such favourable conditions prevailed. So the factors responsible for the growth of settlements may be some attractive sites or advantageous economic, social, cultural or political situations.

Site: When we talk of the site of any settlement, it means the piece of land on the earth's surface which the settlement actually occupies. The genesis and development of human settlements depend mostly on the nature of a place or site and, the availability of facilities at that site that are favourable for human habitation. Suitable climate, plain land with fertile soil, availability of water, protection from floods and the presence of natural resources (and even human) are some of the site advantages. Greater prevalence of settlements in valleys, along a spring-line or on the southern slopes illustrates how the site decides the location of any settlement.

However, site advantages are more important in rural areas than in urban since in rural areas humans interact more with the physical environment. Cities once developed are less dependent on sites because they have alternatives available like water pipes to reach water or air conditioners to modify climatic extremities. Villages located on a favourable site may eventually develop into towns and cities. Piedmont villages, dry point towns, port cities are all examples of advantageous sites for human settlements.

Situation: The term situation has a wider connotation and covers the economy, culture and political importance of a place. It refers to the position of a settlement in relation to its surroundings. The origin and growth of urban settlements are determined more by their situation than site as compared to rural ones. Even though the origin of an urban settlement may be attributed to its advantageous site, yet it flourishes only if situational advantages are present. These include the economy of the hinterland, proximity to other urban centres, good transportation network, favourable social and political environment and so on. In case of rural settlements, only two situational aspects are important---nearness to urban centres and degree of connectivity.

In the true sense, site is a constituent part of the situation. While site emphasizes more on the natural aspects, situation gives importance to both natural and human-made characteristics. Site is specific but situation is general. Based on his study of Berlin, it was **Friedrich Ratzel** who first distinguished between the site and situation of human settlements.

SAQ 2

a) Define the site of any settlement.
b) Who first distinguished between the site and situation of a human settlement?

10.4 CLASSIFICATION OF SETTLEMENTS

At varying levels of study, both quantitative and qualitative methods may be used to classify settlements. Quantitative methods requires large database which are sometimes not available. But they generate precise and accurate classifications since they are based on statistical and mathematical methods. Quite often therefore, empirical observations and qualitative assessments are resorted to for the classification of human settlements.

Though settlements share several common attributes, yet each settlement is different from the other and presents some unique personality of its own. Hence, settlements may be classified on the basis of their size, forms, types and most importantly on the basis of functions.

10.4.1 Classification on the Basis of Size

The model used to demonstrate the evolution of settlements assumes the growth of a settlement from a hamlet to a metropolis and finally the megalopolis that transcends beyond regional relevance to emerge as world cities. However, as a settlement passes through its evolutionary process, it possesses certain characteristics that are generally typical of that stage. In this section we will try to have an insight into it. Normally, in terms of size, settlements follow somewhat a sequence like

Hamlet → village → town → city → metropolis → megalopolis

In ancient India, settlements were classified according to their size as *Kugrama* being the smallest settlement and *Nagara* being the largest. In between were the *Grama* and *Pattana*.

Hamlet: Sometimes it really becomes difficult to distinguish between a hamlet and a village since a hamlet does not have any specified minimum number of buildings. Usually in a hamlet there are fewer buildings as compared to a village and that too loosely clustered. A hamlet in general, has a poor communication system and comprised of homogenous group of people who are mostly engaged in primary resource extraction (like agriculture, fishing etc.).

Village: As per size, a village is larger than a hamlet but smaller than a town. It is essentially rural in which, again most of the people are engaged in primary activities. Neither manufacturing nor commerce plays any significant role in its economy. However, in comparison to a town, a village is more closely related to its surrounding.

Town: A town is not merely a settlement unit. Towns sometimes are defined as villages which succeed though, all towns did not necessarily develop from

villages. A town is one in which human-made structures predominates and there are functionally distinct parts like residential, administrative, commercial or industrial areas. According to **Emrys Jones**, a town is a physical agglomeration of houses and streets that is a centre of commerce and administration where the socio-economic structure is more complex and occupations are more heterogeneous.

City: A city simply means a leading town that has shadowed its local and regional rivals in terms of population, areal size and economic production. A city is inhabited by heterogeneous social groups who are engaged in a variety of non-primary economic activities. This means that the city exhibits a very complex social and economic interaction among its inhabitants. **Lewis Mumford** has described a city as the physical forms of the highest and most complex form of associative life.

Metropolis: A metropolis is a large city with a very wide sphere of influence and that which dominates a number of small towns and villages. It is generally inhabited by a cosmopolitan population performing a variety of specialised functions. But in a metropolis, merchants and bankers generally wield power over the working class.

Megalopolis: We have already discussed about the megalopolis in Box 10.1. Mention of it may also be found in Unit 9 regarding who coined the term and what it actually meant. It is a fact that the Boston-Washington Urban Corridor comprises of 30 metropolises and hosts one of the largest and wealthiest urban populations of United States playing a pivotal role in the country's economy since 1950s. Other examples of megalopolises are the Tokaido Megalopolis (Fig. 10.4) extending from Tokyo-Yokohama to Osaka-Kobe-Kyoto.

Fig. 10.4: Tokaido Megalopolis.

While the size of any rural settlement is determined by its natural, social and economic environment, the size of an urban settlement depends on a variety of complex reasons, the most important being its function.

10.4.2 Classification on the Basis of Forms

Settlements may take up various forms which simply denote the spaces or distances between the houses. Accordingly, settlements may be classified as dispersed, fragmented and compact.

a) Dispersed Settlements: Also known as ***sprinkled settlements***, dispersed settlements are the results of centrifugal forces. They are characterised by complete diffusion of houses i.e. there are long distances between the dwellings. Dispersed settlements (Fig. 10.5) are generally common in areas of unsuitable climate, hilly or mountainous areas, thickly forested land or agricultural lands with poor fertility. Sometimes economic development of the countryside gives way to dispersed settlements from old compact ones. The places where there is no problem of defense or security also give rise to dispersed settlements. Sometimes the social structure of a region as in India, particularly caste groups also promote dispersed settlements. Dispersed settlements are common in the arid and semi-arid regions of Rajasthan, the forest lands of north-eastern states or on the high altitudes of the Himalayas.

Fig. 10.5: Dispersed Settlements

b) Semi-Compact or Fragmented Settlements: These settlements are also known as the ***semi-sprinkled settlements.*** They consist of several fragments or generally hamlets ranging from four to ten or more which may be separated by cultivated fields, *nallahs,* forest tracts etc. The other purpose behind fragmentation in some areas like in India, may be the caste system as people of a particular caste group prefer to stay together and away from other caste groups. Fragmented settlements are visible in the Gangetic Plains of Eastern U.P, Bihar and West Bengal.

c) Compact Settlements: In this type of settlements, the dwellings are all agglomerated or clustered at one single site and exhibit a high degree of cohesion. Hence, they are also known as ***agglomerated or clustered settlements*** (Fig. 10.6). They are the results of active centripetal forces like flat plains with fertile soils, sufficient rainfall, high water table or Perennial River, rich forest, past insecurities and the need for social, economic and religious cooperation. Such settlements maybe seen in the Gangetic Plains or the flat plateau areas of Peninsular India.

Fig. 10.6: Clustered Settlements.

10.4.3 Classification on the Basis of Morphology or Shape

When we study the shape of any settlement in its relation with a road, railway line, river, a mountain etc. it designated a pattern. Let us discuss some of the most commonly observed patterns of settlements (mostly in rural areas) (Fig. 10.7).

Linear Pattern: In this pattern, the settlement is situated along a road, river or a canal. The doors of the houses face the road or the river whereas the houses at both sides of the road or river face each other.

Checkerboard Pattern: In a plain region sometimes settlement starts developing at the confluence of two highways. The streets of the settlements also follow the highway and finally the settlement gets the shape of a checkerboard and forms a checkerboard or *rectangular* pattern.

Radial Pattern: When a number of streets or roads meet at one point or radiate out from one point, then the houses situated along those streets or roads form a radial pattern. About one-third settlements in India form this pattern of settlements.

Triangular Pattern: This type of pattern is found in places where any river or road meets another river or road but both do not cross each other. In this, the settlements develop either on one side of the road or river or on both sides.

Circular Pattern: The houses in any settlement surrounding any lake, pond etc. form a circular pattern. These types of settlements may again be of two types---a) *nucleated* if the settlement has any main building in the centre and b) *nebular* if the settlement has any pond or lake in the centre.

Arrow Pattern: If any settlement is located along the river's meander and there are more houses at the front side than at the back, the settlement is said to form an arrow pattern.

Star Pattern: If a circular settlement extends in multiple directions or a radial settlement grows along the radium (road), it then takes the shape of a star. So it is evident that a star pattern settlement develops from a circular or a radial pattern settlement.

L-Shaped: When any road or railway line meets any river or mountain at right angle, houses develop on one side of the road or railway line to form an L-shaped settlement.

Fan-Shaped: The delta of a river is generally triangular or fan-shaped. So any settlement on a river delta is also fan-shaped.

Terrace Pattern: This pattern of settlements is generally found along the mountain slopes. The settlements are distributed in different tiers.

Amorphous Pattern: Many settlements do not have any concrete shape but are rather irregular and unplanned. The houses generally develop where more facilities are available.

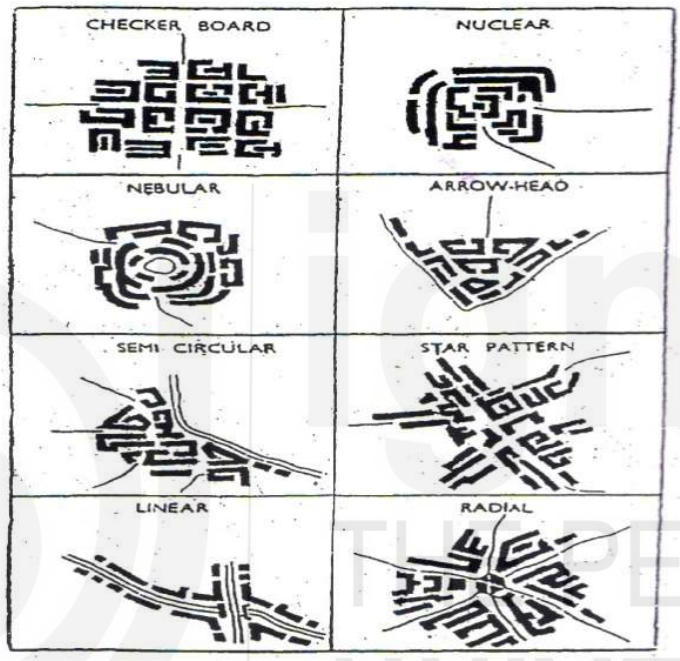

Fig. 10.7: Patterns of Settlements.

10.4.4 Classification on the Basis of Functions

Classification of settlements on the basis of their dominant economic functions presents a more meaningful exercise. Most functional classifications therefore, use data related to the occupational structure. It is a universally accepted fact that the major division in settlement systems lies along the rural urban line. Though there is a consensus on the classification of settlements as rural and urban yet there is lack of precision in distinguishing between the two. In fact, today it is becoming more common to think in terms of a *rural urban continuum.*

Rural: Most often rural settlements are defined in terms of those attributes which are not found in urban settlements. Most of the rural settlements across the world are found to be stable and permanent and dominated by open countryside. The inhabitants of rural settlements are mostly engaged in primary activities like agriculture, forestry, fishing, dairying etc. and depend on the exploitation of natural resources for their livelihood.

Box 10.2: Delineation of Rural Settlements in India.

In India, rural settlements are delineated on the basis of several factors like:

Presence of Village Deities: In many parts of India, the presence of village deities determines the sphere of influence of a rural settlement. In North India such deities are known as *Khetrapals* and in South India as *Keval-Daivams* who are responsible for keeping vigil and protecting the rural settlements.

Revenue Village: Sometimes the administrative delineation for the collection of revenues determines the limit of any rural settlement.

Census Village: Sometimes village boundaries are delimited for the purpose of conducting census operations.

Panchayati Raj System Village: Villages constitute parts of the Panchayati Raj System in India. Some villages are delineated on the basis of the panchayats they are part of.

Abandoned Villages: The Kuldhara village in the Jaisalmer district of Rajasthan is a classic example of this type where the fear of a curse prevents the villagers from entering inside the village till date.

Resettlement Villages: Sometimes due to natural disasters or development projects, families get displaced. They are then relocated and resettled in some other place and these form resettlement villages. For example, the Rural Resettlement Colonies around Haridwar and Dehradun in Uttarakhand were formed after the original villages were submerged due to Tehri Dam Project.

Migratory/Transhumance Villages: There are several tribes in India like the Bhotias who practice transhumance. They live in rural settlements which may remain desolate during winters if they are located on the mountains or during summers if they are located in the valleys.

Urban: Urban settlements are those in which the inhabitants are engaged in non-primary activities for their livelihood ranging from manufacturing, services, management functions and a host of other personal and professional services. The criteria to distinguish between rural and urban settlements differ from country to country. In India, the Census has got its criteria for identifying settlements as urban which has remained the same since 1961. Hence, according to the 2011 Census of India, an urban area is:

1. All places having a Municipality, Corporation, Cantonment Board or Notified Town Area Committee.
2. All other places which satisfy the following criteria:
    a. A minimum population of 5,000.
    b. Atleast 75 percent of the male workers being engaged in non-agricultural pursuits.
    c. A population density of at least 400 persons per square kilometer or 1,000 persons per square mile.

In respect of some marginal cases, the Director of Census of each State/Union Territory in consultation with the respective State Government has been given the discretion to include or exclude some places as urban.

SAQ 3

Fill in the blanks with suitable words:

a. The word ……. was originally used to describe the urban corridor stretching from Boston to Washington.
b. Mountain slopes generally exhibit …… pattern of settlements.
c. Compact settlements are the result of …….. forces.
d. Kuldhara is an example of an …….. village.

10.5 THEORIES OF THE EVOLUTION OF HUMAN SETTLEMENTS

While we were discussing about the origin and growth of human settlements, what was evident was that there were certain junctures that proved to be conducive for the evolution and growth of human settlements. These junctures were the settling down of humans at one place, production of surplus food and other items and emergence of settlements as market and trade centres, as centres of power or as cultural hubs. In this section, we will try to learn about the different theories which describes about the origin and evolution of settlements.

Social scientists, especially historians and archaeologists have proposed four such theories:

- **Hydraulic Theories:** The Concept of a Surplus.
- **Economic Theories:** The Settlement as a Market Place.
- **Military Theories:** The Settlement as a Strong Point.
- **Religious Theories:** The Settlement as Cultural Entities.

Hydraulic Theories: This theory is based on a simple assertion of the British archaeologist, **Sir Leonard Woolley**. In his views, real civilization could begin only in regions where the type of soil and climatic conditions were favourable enough to facilitate surplus production. Only in such situations humans could be relieved from the need to devote all their energies and all their thoughts struggling for mere survival. At the same time, they should have been in a position to procure things from others that were not naturally available on their own land by means of barter as such items were necessary for their well-being and development. Moreover, such conditions should have prevailed over an area large enough to maintain not merely a small group of people but a sufficiently large population. Only then it could have supported occupational specialisation and social development and the beginning of civilization was marked.

Economic Theories: There are two closely related interpretations to the economic theories. The first interpretation may be termed *'mercantile'* because it views the development of any settlement as a result of long distance trade. The second interpretation may be termed as *'market'* because

it views that any settlement is created to focus on its own internal processes of exchange.

Military Theories: A circular element noted in the Egyptian hieroglyph generally depicts a wall or a set of external defense encircling any settlement. Hence, it may be concluded from this that the origin of the settlement lay in the need for people to gather together in search for protection. Another interesting fact to support this is that the people of Catal Hoyuk, a Neolithic settlement in Anatolia in present day Turkey constructed dwellings without any doorways. The only entry to the dwellings was through roofs. Instead of constructing any wall around the settlement, they fringed it with an unbroken line of houses and store-rooms in which access was possible only through the roofs.

Religious Theories: The great medieval geographer **Ibn Khaldun** distinguished between two types of cultural systems. The first was the *Nomadic Culture (Umran Badawi)* that was characteristic of the pre-Islamic societies and the second was the *Civilized Culture (Umran Hadari)* that was characteristic of the post-Islamic societies. The latter could exist only when there was attachment to a certain locality, respect for authority and reverence to the rights of others. This therefore, required a transition from the Nomadic Culture to the Civilized Culture that was possible only through social organisation. This social organisation was provided in this case by the religion of Islam. In India too, many settlements apart from occupying physical spaces, are also part of mythological or religious spaces. They are known as *'tirthas'* like Ayodhya, Kashi (Varanasi), Prayag etc d

SAQ 4

Fill in the blanks with suitable words:

a. The hydraulic theory is based on the simple assertion of ……
b. The …….. interpretation views settlements as created due to long distance trade.
c. The circular element in the Egyptian …….. depicted a wall.
d. …… means Civilized Culture.

10.6 SUMMARY

A settlement is a manifestation of human adaptation to the environment. In other words, a settlement may refer to a space-bound social organisation that is part of the cultural landscape superimposed on the natural landscape. Gradually people feel attached to a place, identify themselves with that place and develop a sentimental attachment to it---a phenomenon that is known as 'topophilia.' C.A Doxiadis propounded ekistics as the science of human settlements that principally studies the evolution of human settlements through time as well as the principles behind the creation of settlements. Human settlements may be conceived as a complex whole comprising of natural and human-made subsystems which Doxiadis named as--- as nature, shells, anthropos, society and networks. As human beings build homes or create settlements, they have certain considerations like safety and security,

survival and propagation of their collective groups. Subsequently, these considerations develop into principles--- maximisation of human being's potential contact, minimisation of efforts, maximisation of the protective space, optimisation of the quality of human beings' relationship with the five elements and organisation of settlements.

Information regarding when and where the first settlements developed is still obscure. Archaeological evidences suggest that the first human settlement developed in the Neolithic Period. Prior to that, primitive men lived as wanderers. Upto 10,000 B.C., humans lived in caves or treetops or tree houses. Between 10,000 and 5,000 B.C., humans learnt the art of cultivating plants. Gradually human beings started settling near the fields they cultivated and built huts with locally available material such as mud, bamboo, thatch etc. The development of the earliest settlements began to take shape in the Neolithic Period somewhat between 5,000 and 1,000 B.C. This was the initiation of community dwellings when humans started organising themselves under some able leadership and stay in a place. Eventually, humans learnt to practice multiple cropping and acquired the skill to prepare manures. Increased food security initiated permanent settlement. Some of the oldest settlements could be traced back along the river valleys in India, China, and Egypt. The earliest urban centres came into existence somewhat around the later part of the Neolithic Period when the early farmers could produce surplus food and some part of the population was freed from tilling the lands to engage themselves in non-agricultural works. Some of the first towns of the world were mostly found in Egypt, Indus Valley, and Mesopotamia. With the advent of the Bronze Age, some new trading centres emerged which benefitted from sea trade through the Mediterranean Sea. Mohenjodaro-Harappa presented one of the oldest examples of systematic town planning. The Greek and the Roman city-states appeared somewhat between 2,000 B.C. and 1,000 B.C. The period between 1500 and 1750 A.D. i.e. the Renaissance Period witnessed considerable expansion of many cities in Europe. Following the Industrial Revolution, there was a greater increase in the number and size of towns and the invention of rail transport favoured settlements to develop as hubs of communication.

The location of human settlements depends on certain favourable factors be it attractive sites or advantageous economic, social and political environment. When we talk of the site of any settlements it means the piece of land on the earth's surface which the settlement actually occupies. Suitable climate, plain land with fertile soil, availability of water, protection from floods and the presence of natural resources (and even human) are some of the site advantages. Site advantages are more important in rural areas than in urban since in rural areas humans interact more with the physical environment. The term situation has a wider connotation and covers the economy, culture and political importance of a place. It refers to the position of a settlement in relation to its surroundings. These include the economy of the hinterland, proximity to other urban centres, good transportation network, favourable social and political environment and so on. The origin and growth of urban settlements are determined more by their situation than site as compared to rural ones.

Though settlements share several common attributes, yet each settlement is different from the other and presents some unique personality of its own. Hence, settlements may be classified on the basis of their size, forms, types and most importantly on the basis of functions. The model used to demonstrate the evolution of settlements assumes the growth of a settlement from a hamlet to a metropolis and finally the megalopolis On the basis of size, settlements may therefore be classified as hamlets, villages, towns, city, metropolis and megalopolis. Settlements may take up various forms which simply denote the spaces or distances between the houses. Accordingly, settlements may be classified as dispersed, fragmented and compact. The pattern of settlement refers to the morphology or shape of the settlement. When we study the shape of any settlement it is relation with a road, railway line, river or a mountain etc. Settlements may form different patterns like circular, rectangular, linear, triangular, fan-shaped, terrace or even amorphous. Classification of settlements on the basis of their dominant economic functions presents a more meaningful exercise. It is a universally accepted fact that the major division in settlement systems lies along the rural urban line. Though there is a consensus on the classification of settlements as rural and urban yet there is lack of precision in distinguishing between the two. In fact, today it is becoming more common to think in terms of a rural urban continuum.

The origin or evolution of settlements has taken place at certain favourable junctures. The different theories related to the evolution of settlements present different explanations for their origin and development. The Hydraulic Theory is based on the fact that the development of human settlements is possible only when there are favourable water, soil and limate Conditions for surplus production for humans to divert themselves from thoughts of mere survival to occupational specialisation and social development. The economic theories provide two interpretations for the origin of settlements. One interpretation views the settlement being created due to long distance trade while the other views settlements to be created to focus on its own internal processes of exchange. The military theories believe that the origin of the settlement lay in the need for people to gather together in search for protection. The religious theories uphold that religion provides social organisation that leads to a settled life.

10.7 TERMINAL QUESTIONS

1. Discuss the underlying principles determining the creation of human settlements.
2. Briefly trace the evolution of settlements from the Neolithic Period till the present times.
3. Attempt a classification of settlements on the basis of their size.
4. Elucidate on the Hydraulic theories of the origin of settlements.

10.8 ANSWERS

Self-Assessment Questions (SAQ)

1. a) Greek architect, Hippodamus is known as the Father of City Planning.

   b) A nekopolis is a city of the dead where overcrowding and degradation leads to famine, war etc. and the city finally decays.

2. a) Site of any settlements it means the piece of land on the earth's surface which the settlement actually occupies.

b) Based on his study of Berlin, it was Friedrich Ratzel who first distinguished between the site and situation of human settlements.

3. a) Megalopolis b) Terrace c) Centripetal d) Abandoned

4. a) Sir Leonard Woolley b) Mercantile c) Hieroglyph d) Umran Hadari

Terminal Questions

1. As human beings build homes or create settlements, they have certain considerations like safety and security, survival and propagation of their collective groups. Subsequently, these considerations developed into five principles which are---maximisation of human being's potential contact with natural elements, other humans and human-made elements, minimisation of efforts required by humans to achieve their actual and potential contacts, maximisation of the protective space of humans, optimisation of the quality of human beings' relationship with the five elements constituting the settlement system, i.e. nature, other people, society, shells (buildings and houses) and networks and organisation of settlements in such a way as to achieve an optimum synthesis of the above four principles.

2. Information regarding when and where the first settlements developed is still obscure. Archaeological evidences suggest that the first human settlement developed in the Neolithic Period. Prior to that, primitive men lived as wanderers. Upto 10,000 B.C., humans lived in caves or treetops or tree houses. Between 10,000 and 5,000 B.C., humans learnt the art of cultivating plants. Gradually human beings started settling near the fields they cultivated and built huts with locally available material such as mud, bamboo, thatch etc. The development of the earliest settlements began to take shape in the Neolithic Period somewhat between 5,000 and 1,000 B.C. This was the initiation of community dwellings when humans started organising themselves under some able leadership and stay in a place. Eventually, humans learnt to practice multiple cropping and acquired the skill to prepare manures. Increased food security initiated permanent settlement. Some of the oldest settlements could be traced back along the river valleys in India, China, and Egypt. The earliest urban centres came into existence somewhat around the later part of the Neolithic Period when the early farmers could produce surplus food and some part of the population was freed from tilling the lands to engage themselves in non-agricultural works. Some of the first towns of the world were mostly found in Egypt, Indus

Valley, and Mesopotamia. With the advent of the Bronze Age, some new trading centres emerged which benefitted from sea trade through the Mediterranean Sea. Mohenjodaro-Harappa presented one of the oldest examples of systematic town planning. The Greek and the Roman city-states appeared somewhat between 2,000 B.C. and 1,000 B.C. The period between 1500 and 1750 A.D. i.e. the Renaissance Period witnessed considerable expansion of many cities in Europe. Following the Industrial Revolution, there was a greater increase in the number and size of towns and the invention of rail transport favoured settlements to develop as hubs of communication.

3. The model used to demonstrate the evolution of settlements assumes the growth of a settlement from a hamlet to a metropolis and finally the megalopolis that transcends beyond regional relevance to emerge as world cities. Usually in a hamlet there are fewer buildings as compared to a village and that too loosely clustered. A hamlet in general, has a poor communication system and comprised of homogenous group of people who are mostly engaged in primary resource extraction. As per size, a village is larger than a hamlet but smaller than a town. It is essentially rural in which, again most of the people are engaged in primary activities. However, in comparison to a town, a village is more closely related to its surrounding. A town is one in which human-made structures predominates and there are functionally distinct parts like residential, administrative, commercial or industrial areas. In a town the socio-economic structure is more complex and occupations are more heterogeneous. A city simply means a leading town that has shadowed its local and regional rivals in terms of population, areal size and economic production. A city is inhabited by heterogeneous social groups who are engaged in a variety of non-primary economic activities. A metropolis is a large city with a very wide sphere of influence and that which dominates a number of small towns and villages. It is generally inhabited by a cosmopolitan population performing a variety of specialised functions. This is a bloated city in which material wealth dominates life. It comprises of several metropolises and plays a pivotal role in any region's economy.

4. The Hydraulic Theory of the evolution of settlements is based on a simple assertion of the British archaeologist, Sir Leonard Woolley. In his views, real civilization could begin only in regions where the type of soil and climatic conditions were favourable enough to facilitate surplus production. Only in such situations humans could be relieved from the need to devote all their energies and all their thoughts struggling for mere survival. At the same time, they should have been in a position to procure things from others that were not naturally available on their own land by means of barter as such items were necessary for their well-being and development. Moreover, such conditions should have prevailed over an area large enough to maintain not merely a small group of people but a sufficiently large population. Only then it could have supported occupational specialisation and social development and the beginning of civilization was marked.

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UNIT 11

SPATIAL DISTRIBUTION OF HUMAN SETTLEMENTS

Structure

11.1 Introduction
Expected Learning Outcomes
11.2 Distribution of Human Settlements by Size
Distribution of Rural Settlements by Size
Distribution of Urban Settlements by Size
11.3 Spatial & Temporal Trends in Size and Growth of Urban Settlements
Developed Countries
Developing Countries
11.4 Theoretical Models and Empirical Findings
Rank-Size Rule
The Primate City Model
11.5 Summary
11.6 Terminal Questions
11.7 Answers
11.8 References and Further Reading

11.1 INTRODUCTION

Human settlements are diverse in nature, from small hamlets, villages, small towns, medium towns, large cities to very large cities. Such diversity is not only in terms of geographical area, but also population size, economic activities, and socio-cultural activities. It is, therefore, important to ask why and how such diverse human settlements exist on earth surface. Why and how, over time, settlements decline or grow? Are there any interlinks between villages and cities? Are there any models that explain these interlinks? We will try to develop our understanding about these spatial growth and distribution, and find answers to the aforesaid questions.

In this unit, we will learn about distribution of human settlements – both rural and urban. We will discuss the spatial and temporal trends in size and growth of human settlements in Section 7.3. We will also discuss a few relevant Theoretical Models and associated empirical findings.

Expected Learning Outcomes

After studying this unit, you should be able to:

- Distinguish between ‘rural’ and ‘urban’ settlements;

- Describe the spatial and temporal trends in size and growth of human settlements; and
- Explain the significance of relevant theories and their empirical implications across different parts of the world.

11.2 DISTRIBUTION OF HUMAN SETTLEMENTS BY SIZE

Distribution of human settlement can be classified on various bases. One of the most extensively used basis is classification on the basis of size. In the below given sections 11.2.1 and 11.2.2, distribution of rural and urban settlements on the basis of size are discussed.

11.2.1 Distribution of Rural Settlements by Size

Rural settlements are usually smaller in population size. Now, the question is, how small a rural settlement is? The answer varies spatially and temporally. For instance, Census of India, has following categories of villages –

- Less than 200
- 200 – 499
- 500 – 999
- 1000 – 1999
- 2000 – 4999
- 5000 – 9999
- 10000 and above

Some geographers specifically define a village as having between 500 and 2,500 inhabitants (National Geographic Society).

11.2.1 Distribution of Urban Settlements by Size

On the basis of population size (2022), we can categorize urban settlements and can also find that these are distributed in different parts of earth (World Population Review).

- Above 25 million: only three cities Tokyo (Japan), Delhi (India), and Shanghai (China)
- 20 – 25 million: Dhaka (Bangladesh), Sao Paolo (Brazil), Mexico City (Mexico), Cairo (Egypt), Beijing (China), and Mumbai (India)
- 10 – 20 million: 23 cities, majority of which are located in developing / less developed countries like Lagos (Nigeria), Manila (Philippines), Bogota (Columbia), and Lima (Peru). Only a handful cities like Moscow (Russia) and Paris (France) are located in more developed countries.

Moreover, among this list of 23 cities, a few are located only within a single country. We note that –

4 cities are located in China, viz. Chongqing, Tianjin, Guangzhou, and Shenzen.

4 cities are found in India, viz. Kolkata, Bangalore, Chennai and Hyderabad.

2 cities, namely, Karachi and Lahore, are in Pakistan.

- 5 – 10 million: 51 cities, among which, we can find following spatial distribution

14 cities, for example, Chengdu, Nanjing, Wuhan, and Zhengzhou are located in China.

3 cities, namely Ahmadabad, Surat and Pune are situated in India.

2 cities, viz. Nagoya and Fukuoka, are located in Japan

2 cities, namely Melbourne and Sydney are located in Australia

2 cities, viz. Madrid and Barcelona, are situated in Spain

It should also be noted that most of the cities are located in less developed countries of Asia and Africa. Some of these cities are situated in developed countries like USA, Canada, Russia and so on.

- 1 – 5 million: 489 cities
- 500000 – 1 million: 615 cities

SAQ I

a) What is the range of rural population in India as per Census?
b) How many cities in India has more than 10 million population each in India?

11.3 SPATIAL & TEMPORAL TRENDS IN SIZE AND GROWTH OF URBAN SETTLEMENTS

After discussing the distribution of rural and urban settlement by size, the question that might be coming to your mind that how this settlements are spread over time and space. These spatio-temporal distribution have been observed distinctively in terms of developed and developing countries.

11.3.1 Developed Countries

In developed countries, urban settlements have grown steadily due to the rise of industrial and service sector, higher income levels and standard of living.

In 20th Century and afterwards, growth of Suburbs is an important feature of urbanization in more developed countries. These settlements have grown around the outer parts or peripheries of large cities and towns. This is basically a residential area with neighbourhoods of houses. This has primarily happened due to migration of people from core areas of cities to countryside. As pollution, traffic congestion and other problems were escalating in core areas of the cities, people chose to migrate into countryside. A few important features of suburbs are following –

- Suburbs are located far away from workplaces. Therefore, the factor of transport connectivity between home and workplace is important.
- Another important factor is availability of land in which large-scale construction of houses can be done. For example, large house building companies in USA along with banks and mortgage agencies have led massive construction of housing in suburbs.
- Effective demand for housing in suburbs is also required.

We have observed that suburbs initially grow along the main roads which are connected to towns. These form of settlements are known as Ribbon Settlements. Such settlements flourish due to the factor of accessibility.

Later, on account of heightened demand of suburban houses, the vacant lands also get connected by new roads, and consequently, new houses are built-up. As a result, such settlements continue to grow. This form of development is known as Infill.

This should also be kept in mind that although the general characteristics of suburbs are discussed above, its spatial forms and characteristics can also vary over space. For example, in Britain, land use regulations in suburbs are strict. In USA, suburbs are mainly resided by middle to upper income group of white people.

What has happened to city centres? You might be having this question in mind. Let's get an answer. The answer is Urban Renewal, which means a "comprehensive scheme to redress a complex of urban problems, including unsanitary, deficient, or obsolete housing; inadequate transportation, sanitation, and other services and facilities; haphazard land use; traffic congestion; and the sociological correlates of urban decay, such as crime" (Britannica). Residential parts of inner cities experience obstacles like paucity of housing, environmental degradation, social problems and so on. Central business districts are troubled with obsolete houses, traffic congestion and so on.

Are the spatial forms of urban renewal same everywhere? No – is the answer. For instance, in USA, urban renewal activities demolished low income houses and replaced these with middle-to-upper income residential units, and shopping centres. On the other hand, some of the British cities experienced construction of public housing as a result of urban renewal.

Another trend is visible in the cities of more developed countries. Gentrification refers to a "middle-class settlement in renovated or redeveloped properties in older, inner-city districts formerly occupied by a lower income population" (Gregory et al. 2009:273-74). Actually, it leads to a change in social matrix of the neighbourhoods. It was first coined by Ruth Glass, who observed such social transition in the central districts of London during early 1960s. Several large cities like San Francisco, Boston, Toronto and Sydney are a few evidences of this phenomenon. From the perspective of occupational structure, it is a transition from industrial economy to post-industrial (i.e. service-based) economy. As this trend has continued over recent years due to housing market dynamics and strengthening presence of capitalistic power relations, one can visualize massive development in old

industrial areas, waterfront sites and so on. Lees, based on the studies of London and New York, call this as Super-gentrification.

In more development countries, you can find that cities have grown in terms of area. A city has grown and its nearby rural areas have become functionally integrated to it. This integration has social dimensions also. This is termed as Metropolitan Area.

Two or more cities have grown and merged together to form a more dense urban area which is known as Conurbations. In fact, this is a consequent and extended urban form of ribbon settlements. This term was coined by Patrick Geddes.

This form of coalesced urban areas is also observed in different more developed countries. North Eastern seaboard of USA, from Boston to Washington D.C. is an example of such reality. This is termed as Megalopolis by Jean Gottman. Another example is Tokyo, from Tokyo-Yokohama to Osaka-Kobe-Kyoto in Japan. In Netherlands, Randstad megalopolis is formed by three cities, viz. Amsterdam, Rotterdam and The Hague.

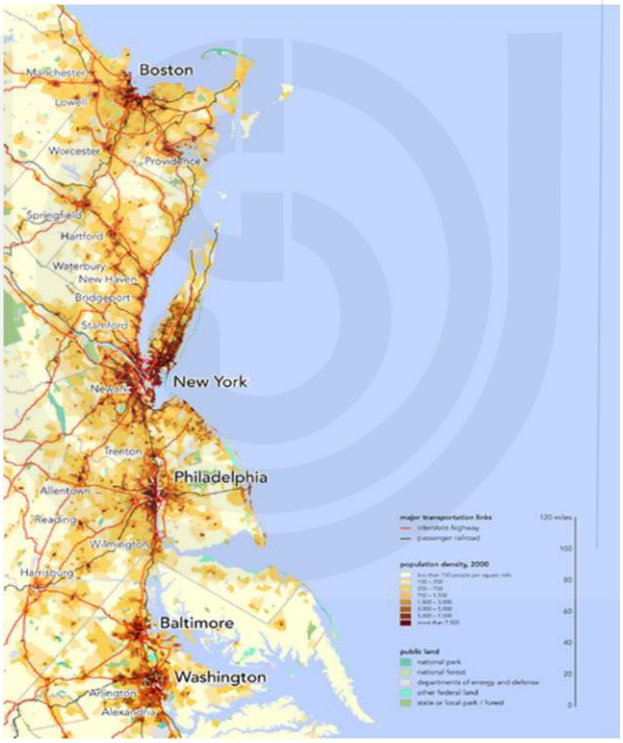

Fig. 11.1: Megalopolis in North-eastern USA.

Some cities in more developed countries, characterized by low fertility rates, are experiencing population decline. An example is Nagasaki in Japan. Various cities of Poland, Romania and Ukraine have also lost their population in between 2000 to 2018 – where emigration of people is a contributing factor. It is also projected that a few cities will experience decline in population size by 2030 (World Urbanization Prospects 2018).

11.3.2 Developing Countries

The trends and patterns of urban settlements in developing countries are different. As a large number of Asian and African countries were colonized by

western countries for a long time, the impact of colonization was strong on urban settlements. In the colonized countries, major cities had two functions – export of raw materials and import of manufacturing goods. Therefore, only port cities and their adjacent settlements grew.

After World War – II, it is found that majority of urban dwellers are concentrating in a handful of mega cities (with more than 10 million population) which are portrayed as engines of economic growth. According to World Urbanization Prospects 2018, there were only 10 mega cities in 1990. Now, in 2018, this stands as 33 among which a large chunk from Asia. China and India are having several mega cities, and the numbers are expected to go up in future. Cairo, Kinshasa and Lagos are already megacities in Africa, and it is projected that Dar es Salaam and Luanda would join the league within 2030. In Latin America, old mega cities were Buenos Aires, Mexico City, Rio de Janeiro and Sao Paulo. Now, Bogota and Lima have reached the threshold of 10 million population size. It should be noted that the resource base of these cities often find it difficult to accommodate such rapid growth of population. Environmental and infrastructural problems like traffic congestion, noise pollution, lack of potable drinking water, paucity of toilets, and mismanagement of solid waste start appearing and aggravating.

This population – resource imbalance in the large cities is reflected in the proliferation of slums. Slums are basically portrayed as spatial manifestations of urban poverty. As per the figures available with World Bank in 2018, a significant percentage of urban population in emerging economies like India (35.2 percent), South Africa (25.6 percent), and China (24.6 percent) lives in slums. These percentages are higher in western and central parts of Africa. The preponderance of slums is mainly due to large-scale and rapid migration of people from rural areas to large cities in search of jobs and to avail various infrastructural benefits for a better standard of living.

Majority of in-migrants, who are poor or having low income, settle down in the unplanned and cheap lands of urban fringes of large cities which often lack access to basic amenities like metalled road, drinking water, sanitation and street lights. Such fringe areas are characterized by features like “mixed land use”, “urban and rural landscape features”, and “unplanned layout of buildings and road systems” (Ghosh, 2008:73 -74).

In contrary, the small and medium towns, which are located at relatively less developed regions, are losing importance to a certain extent. Many rural people are not migrating into such towns, and directly rushing to large cities. It is probably happening due to less economic viability and lack of infrastructure in these small and medium towns.

It is also observed that New Towns are being built-up in some of the developing countries. According to Ghosh (2008:78), “A New Town is a planned, self-contained settlement with a controlled population density which has all the urban advantages without damaging either the physical or the social environment. It is designed primarily to receive the excess population from congested conurbations and create a balanced urban environment.” Now-a-days, information technology enabled services are being promoted to run such cities. For instance, Geographical Information System (GIS) is being

used to collect property tax from houses and commercial buildings. Global Positioning System (GPS) enabled vehicles are being used for proper management (i.e. collection, segregation and disposal) of solid waste generated in cities.

SAQ 2

a) The term 'Conurbation' was coined by _____.
b) A mega city has a minimum population size of
(a) 5 million, (b) 20 million, (c) 10 million and (d) 1 million

11.4 THEORETICAL MODELS AND EMPIRICAL FINDINGS

Human settlements – both 'rural' and 'urban' are interlinked to each other. The links are present in terms of flow of people, goods and services (Fig. 11.2).

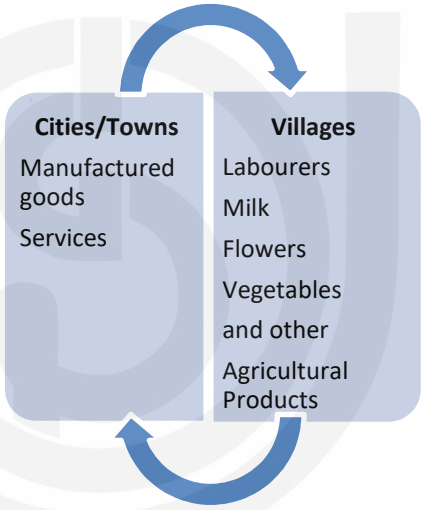

Fig. 11.2: Functional interrelationships of rural and urban settlements.

Usually, such flows are stronger from smaller settlements to larger settlements. That's why, the characteristics of settlements change over space and time. Hence, we can find a stepped hierarchy of human settlements. Ideally, this hierarchy with uniform distribution in space leads to maximum degree of stability. To elaborate this, various models have been discussed in geography – rank-size rule, the primate city model, spatial models of Christaller and Losch (Ghosh, 2008:46 – 47). Here, we will discuss rank-size rule and the primate city model. You will read and learn the spatial models in Unit 15 – Settlement Hierarchy.

11.4.1 Rank-Size Rule

It is generally observed that smaller settlements like hamlets and villages are higher in number, whereas larger settlements like towns and cities are comparatively lower in number. One can find a general gradation from smaller size of settlements to larger size of settlements.

Rank-Size rule states that "if all settlements are ranked according to size with the largest city having the first rank, then the population of a town multiplied by its rank, will equal the population of the largest city". Let us explain –

PR = P1 / R

Where, PR = Population of the city with rank R

P1 = Population of the largest city

Rank-Size Rule

Let's do some basic calculations –

Question: You have obtained a dataset of region – X. The population of the largest city in X is 300000. Then, what would be the population of the 5th ranking city?

Answer: (300000 / 5) = 60000

If rank-size relationship is valid, then we can simply plot population against ranks on arithmetic graph paper. It would show us an inverted J-shaped curve. If someone plots in logarithmic graph, with logarithmic values in both scales, a linear relationship is established between two variables (i.e. rank and population size).

G. K. Zipf (1941) formally talked about rank-size rule. He studied 100 largest metropolitan districts of USA and established the aforesaid equation. His argument was if this relationship "held throughout a country, it indicated that national unity is maintained through an integrated urban system" (Ghosh, 2008: 49).

Later, various scholars have tried to empirically validate this rule. For instance, Berry and Horton (1970) have studied 37 countries across the world, and the results are following –

Table 11.1: Empirical Validity of Rank-Size Rule, Berry and Horton (1970)

	Number of Countries	Remarks
1	13	Follow rank-size distribution
2	9	Intermediate
3	15	Primacy

(Source: 'Introduction to Settlement Geography', Sumita Ghosh, 2008: 49 – 50)

One of most famous geographers in India, Professor R. Ramachandran (1989) has analysed the empirical validity of rank-size rule in India by using Census 1981 datasets. His results have shown that this rule is valid only for three states of India, namely Rajasthan, Uttar Pradesh and Haryana.

Rank-size rule is argued to be more valid for smaller settlement systems that have evolved under a homogeneous environment. In reality, that means under heterogeneous conditions, several distortions take place and we can find following distributions/patterns (Hagget):

1. *Binary pattern:* When a few large cities have approximately same population size, for example, growth of industrial townships like Rourkela and Jamshedpur.
2. *Primate pattern:* When one or two cities have very large population size, and then a sharp decline to various smaller settlements with almost similar population size. For instance, Kolkata, with high concentration of industrial, commercial and service functions.

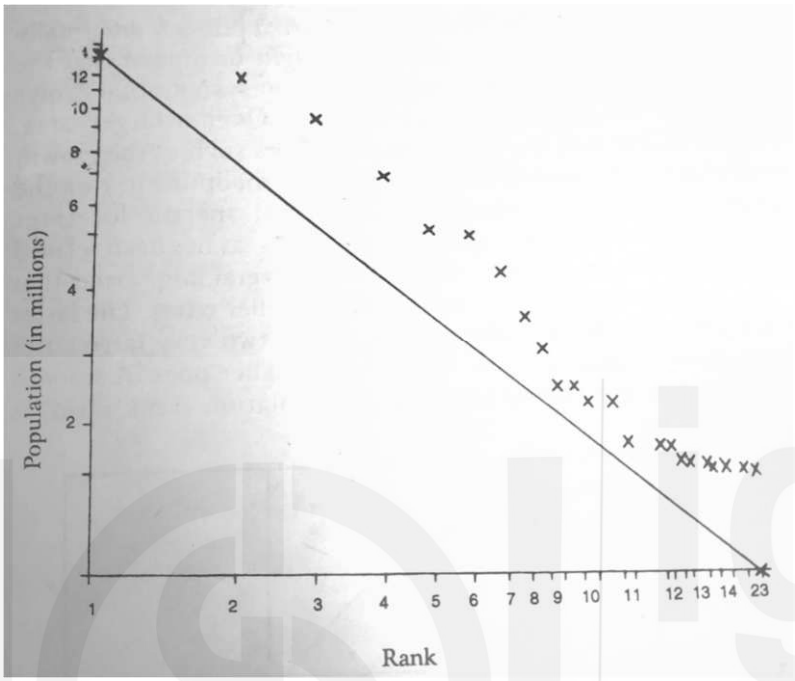

Fig. 11.3: Rank-Size Relationship of 23 metropolitan cities in India, 1991. The straight line is the hypothetical / ideal one if rank-size relationship stands valid.

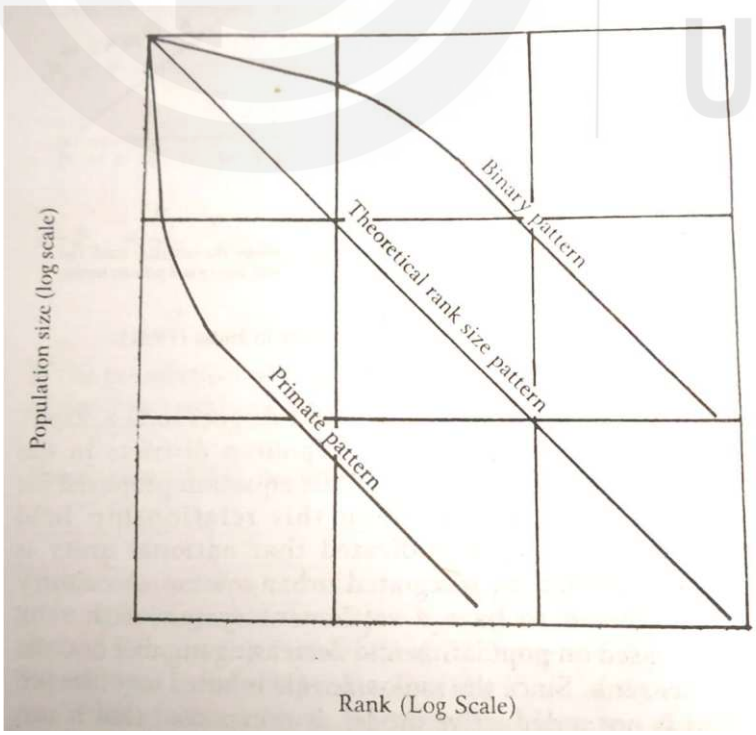

Fig. 11.4: Three situations in a settlement system after Hagget (Ghosh, 2008: 50).

11.4.2 The Primate City Model

The concept of urban primacy, also mentioned above, was first coined by Mark Jefferson in 1939. As per his observations, the population size of first ranked city is more than double that of the second ranked city and even five times greater than the third ranked city. He has opined that this supremacy of first ranked city is not just related in terms of population size, but also in socio-cultural, political and economic importance. It can happen when economic activities, especially industries and services concentrate in a particular city which also happens to be an administrative headquarter, then the city experiences rapid in-migration from rural areas and small towns. Therefore, it population size increases to a large extent that overshadows all other settlements. In due course of time, its importance in terms of population size and functional complexity also increases.

Index of Primacy (PI) is calculated to portray degree of primacy of any city. For this, any of the following equation is used –

$PI = P_1 / P_2$

Or

$PI = P_1 / (P_2+P_3+P_4)$

Where P_1, P_2, P_3 and P_4 are population size of 1^{st}, 2^{nd}, 3^{rd} and 4^{th} ranked cities, respectively.

Berry and Horton (1970) have found out that urban primacy is generally observed in following countries (Ghosh, 2008: 53 – 54) –

1. Small countries engaged in production of a handful commodities (e.g. Austria, Sweden, Netherlands and Denmark);
2. Countries with commercialization laid over subsistence agriculture (e.g. Sri Lanka and Mexico)
3. Small countries with subsistence economy (e.g. Thailand)
4. Countries with traditional empires (e.g. Portugal)

Even a cursory glance at the history of urban settlements tells us that urban primacy is a common phenomenon. From Rome to Stockholm, Oslo, Paris and Brussels – primate cities have kept on changing in Western Europe. At present, Kolkata is a good example of primate city. Continuing the legacy of locational advantages of river port and administrative set-up, this city has been a hub of present day industrial, commercial and service activities, as well as a centre of art & culture. Therefore, the presence of Howrah, just on the opposite bank of Hugli river, is blurred, let alone regional cities like Asansol & Durgapur or Siliguri in West Bengal. Ramachandran (1989:194) has aptly remarked that “Apart from size, Calcutta is indeed Bengal in cultural and economic sense.” But, the question is – can you call Kolkata’s case is an exception or something unusual in a developing country like India? Even after independence of India (1947), the priority of modernization amidst serious resource crunch shifted policymakers’ attention into a few developed cities, and Kolkata was among these. Additionally, on account of a huge influx of migrants from present-day Bangladesh, just after independence, rapidly

increased the population size of Kolkata. However, you should also note that West Bengal's urban hierarchy is lopsided and tilted towards Kolkata due to its manifold significance.

11.5 SUMMARY

- Human settlements are divided into two categories 'rural' and 'urban'. But there are interlinks between these two categories of human settlements. These interlinks are dynamic over space and time, leading to decline or growth of human settlements.
- In more developed and less developed/developing countries, we can find several trends and patterns – amongst which the growing concentration of population in a handful of megacities, is of prime importance.
- Rapidly growing cities in less developed / developing countries are attracting policy attention because population – resource balance needs to be maintained and an overall systematic / balanced hierarchy of human settlements is very important to us.

11.6 TERMINAL QUESTIONS

1. What are suburbs?
2. What is known as 'Gentrification'?
3. Write a short note on Rank-Size Rule
4. What is urban primacy?

11.7 ANSWERS

Self-Assessment Questions (SAQ)

1. Less than 200 to More than 10000 and above
2. Six cities
3. Patrick Geddes
4. (c) 10 million

Terminal Questions

1. Suburbs have grown around the outer parts or peripheries of large cities and towns. This is basically a residential area with neighbourhoods of houses. Suburbs are located far away from workplaces. Therefore, the factor of transport connectivity between home and workplace is important. Another important factor is availability of land in which large-scale construction of houses can be done. For example, large house building companies in USA along with banks and mortgage agencies have led massive construction of housing in suburbs. Effective demand for housing in suburbs is also required.

2. Gentrification is a process by which middle or high income classes of people settle down in old and dilapidated inner city areas which have been transformed into areas with higher standards of living through revamping of infrastructure and amenities. It was first coined by Ruth Glass, who observed such social transition in the central districts of London during early 1960s. Several large cities like San Francisco, Boston, Toronto and Sydney are a few evidences of this phenomenon. From the perspective of occupational structure, it is a transition from industrial economy to post-industrial (i.e. service-based) economy.

3. Rank-Size rule states that "if all settlements are ranked according to size with the largest city having the first rank, then the population of a town multiplied by its rank will equal the population of the largest city".

PR = P1 / R

Where, PR =Population of the city with rank R

P1 = Population of the largest city

G. K. Zipf (1941) formally talked about rank-size rule. He studied 100 largest metropolitan districts of USA and established the aforesaid equation. Berry and Horton (1970) have studied 37 countries across the world, out of which only 13 are found to have followed rank-size rule. This rule stands more valid for smaller size of countries which have evolved under homogeneous conditions.

4. The concept of urban primacy was first told by Mark Jefferson in 1939. As per his observations, the population size of first ranked city is more than double that of the second ranked city and even five times greater than the third ranked city. He has opined that this supremacy of first ranked city is not just related in terms of population size, but also in socio-cultural, political and economic importance. It can happen when economic activities, especially industries and services concentrate in a particular city which also happens to be an administrative headquarter, then the city experiences rapid in-migration from rural areas and small towns. Therefore, it population size increases to a large extent that overshadows all other settlements. In due course of time, its importance in terms of population size and functional complexity also increases. Kolkata is a good example of urban primacy.

   Index of Primacy (PI) is calculated to portray degree of primacy of any city. For this, any of the following equation is used –

   PI = P1 / P2

   Or

   PI = P1 / (P2+P3+P4)

   Where P1, P2, P3 and P4 are population size of 1st, 2nd, 3rd and 4th ranked cities, respectively.

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https://www.nationalgeographic.org/encyclopedia/village/

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Fig. 1:

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Fig. 3 and 4.

Ghosh, Sumita (2008).Introduction to Settlement Geography, Orient Longman

UNIT 12

FUNCTIONAL CLASSIFICATION OF HUMAN SETTLEMENTS

Structure

12.1 Introduction
Expected Learning Outcomes
12.2 Empirical and Theoretical Models Explaining the Functional Classification of Towns and Villages.
12.3 Functional Classification of Urban Centres
12.4 Functional Typology of Villages
12.5 Functional Landscape
Functional Landscape of Rural Areas
Functional Landscape of Urban Areas
12.6 Functional Structure of Towns in India
12.7 Summary
12.8 Terminal Questions
12.9 Answers
12.10 References and Further Reading

12.1 INTRODUCTION

Settlements may be classified primarily on the basis of their functions. It is often observed that the physical form as well as the social character of any settlement is largely determined by the type and complexity of functions. It is obvious that cities which are usually multifunctional will greatly differ from towns having fewer functions or villages having even fewer functions. This justifies the fact that it is more appropriate to classify settlements according to their functions rather than any other feature or criterion.

Though the classification of settlements on the basis of functions serves as a meaningful classification, however, at times there is difficulty in determining a standard scale on the basis of which the complexity of functions can be measured. Some of the functions considered complex in less developed countries may be considered lower order functions in developed ones.

Several methods however, have been designed from time to time by various scholars for explaining the functional classification of settlements. They may be grouped as qualitative, quantitative and a blend of both the methods. But whatever method may be adopted, sometimes it really becomes difficult to

make clear-cut categorisation as any settlement may perform more than one function as they grow in size.

The first distinction that is normally made in settlements is between rural and urban. However with time, the line of division has been getting blurred and it is now more convenient to think in terms of a continuum. Moreover, as we have already discussed in Unit 10, there is no consensus on what exactly defines a rural and an urban settlement. Population size may be regarded as an important criterion but it may not be treated as a universal criterion since the population size of the rural settlements of villages in India or China may be much more than some towns of Western Europe or Northern America. Again, at one time while most people of villages pursued agriculture or other primary activities, nowadays, large sections of urban population in some of the most urbanised countries of the world prefer to shift to rural areas in search of open space and pollution free environment even though they might be working in cities.

In this Unit we shall try to focus on the different empirical and theoretical models developed by various scholars to functionally classify settlements or precisely towns and villages. At the same time, we shall also discuss about the functional classification and typology of urban centres and villages separately. The functions the settlements perform gives rise to distinct functional landscape since each part of any settlement may be assigned with different functions such as residential, commercial, industrial and so on. The functional landscape of urban and rural areas however, may be different from each other. Finally, we shall discuss the functional structure of towns in India.

Expected Learning Outcomes

After studying this unit, you should be able to:

- develop a knowledge base regarding the different methods adopted by various scholars in functionally classifying human settlements;
- understand how urban centres are classified on the basis of their dominant functions;
- know about the functional typology of villages;
- distinguish between the functional landscape of rural and urban settlements; and
- know about the functional structure of towns in India.

12.2 EMPIRICAL AND THEORETICAL MODELS EXPLAINING THE FUNCTIONAL CLASSIFICATION OF TOWNS AND VILLAGES

Functional classifications of settlements dealing with the structure and distribution of settlement functions or the economic activities they perform area bounding in geographical literature. But the main problem associated with functional classification is assigning some group to each individual settlement. Therefore, the ball always lies in the court of those who are

handling the job. The settlements to be included in a particular group, the list of functions to be reckoned on, the methods to be employed and the interpretations underneath them are entirely based on the value judgement of the author. Hence, to some extent some subjectivity is all-pervading. Nonetheless, it becomes customary to review the preceding functional classification of geographers. In this section, we shall therefore deal with the different models designed by various geographers for studying the functions of any settlement and classifying them on the basis of such functions.

Since the last forty years of the twentieth century, the schemes of functional classification have become more comprehensive and statistically more sophisticated. Another interesting fact to be mentioned here is that since urban settlements offer a wide range of functions, the affinity of most scholars has been towards formulating models and methods for the functional classification of urban centres. Though we will study about the functional classification of rural settlements later in this Unit, yet mostly it is observed that rural settlements are focused primarily on primary activities.

The methods involved in the functional classification of settlements may be categorised as:

- Qualitative Methods.
- Qualitative-cum-Quantitative Methods.
- Quantitative Methods.

Qualitative Methods: This implies the initial stage in the functional analysis of settlements. As such these methods constitute the empirical and non-statistical techniques. The name of Aurousseau (1921) is perhaps the first to be mentioned in this category. He classified the towns into six classes which were further sub-classified into twenty eight subtypes (Table 12.1).

Table 12.1: A Classification of Cities after M. Aurousseau (1921)

Administrative	**Defence**	**Culture**	**Production**	**Communication**			**Recreation**
Revenue Towns	Garrison Towns	University Towns	Manufacturing Towns	**Collection**	**Transfer**	**Distribution**	Health Resorts
	Naval Bases	Cathedral Towns		Mining Towns	Market Towns	Export Towns	Tourist Resorts
		Art Centres		Fishing Towns	Fall Line Towns	Import Towns	Holiday Resorts
		Pilgrimage Centres		Forest Towns	Break-of-Bulk Towns	Supply Towns	
		Religious Centres		Depot Towns	Bridgehead Towns		
					Tidal Limit Towns		
					Navigation Head Towns		

(Source: Aurousseau, M. (1921), The Distribution of Population—A Constructive Problem, Geographical Review, Vol. XI, pp.563.)

Though Aurousseau's classification is quite comprehensive and simple yet it suffered from the lacuna of being over generalised. Moreover, some of the classes are found to be specific to particular countries at particular points of

time. His classification also neglects economic activities which are so very important in deciding the function of a settlement. Various classes of towns suggested by Aurousseau are sometimes confusing since it mixes both functional and locational terms. For example, the tidal limit town grouped under communication category is by no way a functional term.

The qualitative methods of functional classification suffer from the general criticism that they are purely based on the personal observations of the scholars and may differ from one to another. However, Aurousseau's scheme marked an important stage in the development of functional studies by bringing together many diverse ideas into one comprehensive scheme and provided the springboard for new methods.

Qualitative-cum-Quantitative Methods: This marks a transitional stage between the earlier qualitative methods and the later quantitative or statistical methods. In this, occupational data have been used since a clear-cut link may be found between settlement functions and occupational groups. Though data are used for classifying the settlements particularly the urban ones, the qualifying minimum limits or the percentages on the basis of which functional classifications are done are often selected arbitrarily by the scholar.

In 1937, Ogburn presented a functional classification of towns based on the percentage of population engaged in trade, manufacturing and transportation. But the most widely accepted classification in this category is the one put forward by Chauncy D. Harris. He presented his A Functional Classification of Cities in the United States that was published in the Geographical Review in 1943. Harris was quantitatively able to identify the dominant function from the multifunctional character of the cities. He devised a scale of reference from his study of 984 towns (with a population of 10,000 and above) in the United States on the basis of data provided by the 1930 Census. Harris relied on two sets of information---occupation figures and employment figures. Of these two, preference was given to the second set to avoid the inclusion of informal industrial workers such as carpenters and plumbers. He identified nine principal categories of towns. A condensed form of Harris's classification is given in Table 12.2.

Table 12.2: Criteria Used by Harris in Functional Classification of Cities of USA

Types	Principal Criterion	Secondary Criterion
Manufacturing Cities (M' subtype)	Employment in manufacturing equals atleast 74% of the total employment in manufacturing, retailing, wholesaling (employment figures)	Manufacturing and mechanical industries contain atleast 45% of gainful workers (occupation figures)
Manufacturing Cities (M subtype)	Employment in manufacturing equals atleast 60% of the total employment in manufacturing, retailing, wholesaling.	Manufacturing and mechanical industries usually contain between 30% - 45% of gainful workers
Retail Centres (R)	Employment in retailing is atleast 50% of the total	Atleast 2.2 times in wholesaling alone

	employment in manufacturing, retailing, wholesaling.	
Diversified Cities (D)	Employment in manufacturing, wholesaling, retailing is less than 60%, 20% and 50% respectively of the total employment in these activities.	Manufacturing and mechanical industries contain between 25% and 35% of the gainful workers.
Wholesale Centres (W)	Employment in wholesaling is atleast 20% of the total employment in manufacturing, wholesaling and retailing.	Atleast 45% as much as in retailing alone
Transportation Centres (T)	Transportation and communication contain atleast 11% of the gainful workers, and workers in transportation and communication equal atleast one-third the numbers in manufacturing and mechanical industries.	Atleast two-third the numbers in trade.
Mining Towns (S)	Extraction of minerals account for more than 15% of the gainful workers (applies only to cities of more than 25,000 populations).	------
University Towns (E)	Enrolment in schools of collegiate rank (universities, technical schools, liberal arts college and teachers college) atleast 25% of the population of the city (1940)	------
Resort and Retirement Towns (X)	No satisfactory statistical criterion was found. Cities with a low percentage of the population employed were checked in the literature for this function.	------

(Source: Ghosh, S. (2008), Introduction of Settlement Geography, Calcutta: Orient Blackswan, pp.34)

Harris's method of functional classification of cities was followed by many other scholars with some modifications but the choice of the qualifying points was in every case arbitrary. Nonetheless, these methods may be considered a step further towards more rigorous and statistical techniques.

Quantitative Methods: In the previous method, when it is stated that a certain percentage of the labour force involved in any particular function is a *diagnostic ratio*, then it is implied that it is only above this level that employment becomes distinctive when compared with other urban centres. This procedure later became the basis of a number of statistical analyses. In the various functional classifications of towns, specialisation implies a certain proportion of the labour force involved in a given function that exceeds some pre-determined minimum level.

In a report of British ***'Political and Economic Planning'*** (1939), for each functional group of a town, *location quotient (LQ)* was calculated. This was done by finding out the percentage of population employed in a functional group of a town and dividing it by the average employment of the town and then multiplying by 100. As per this technique, a town having a LQ of 100 was earmarked as 'average town.' Towns were then classified into four groups--- least specialised (LQ of 110-129), specialised (LQ of 130-149), highly specialised (LQ of 150-169) and most specialised (170 and above). However, this method does not facilitate intra-town comparison.

An attempt was made by **Pownall** in 1953 to study the functions of the towns of New Zealand. The mean employment for seven different groups of towns was calculated by him and then within its appropriate group, the town was measured in terms of the positive deviation from the national mean. This positive deviation was taken as a criterion for assessing the relative importance of six different functions, namely, manufacturing, building and construction, primary industry, transport and communication, distribution and financial hotel and personal services, administration and professional services. The seventh class i.e. residential function was based on the ratio of the gainfully employed to the total population. In such a way, a town could have specialisation in more than one function.

In 1955, **Howard J. Nelson** put forth a multifunctional classification of American cities purely based on quantitative techniques that came to be popularly known as the *'standard deviation method.'* The technique Nelson developed avoided personal decisions of the scholars and could be understood and checked by other scholars as well. His paper, ***A Service Classification of American Cities*** was published in the journal ***Geography***. Nelson's classification was based entirely upon major industry groups listed in the 1950 Population Census for standard metropolitan areas, urbanised areas and urban places having a population of 10,000 and above. He omitted such groups having little significance like agriculture and construction and arrived at nine major activity groups. Nelson observed that the percentage of employment in any activity group markedly varied among cities. For measuring such variations, he opted for the standard deviation. The standard deviation from the mean was therefore calculated for each of the nine activity groups and variations upto three degrees from the mean were recognised and the cities were grouped in appropriate categories. For example, cities that were over +1SD from the mean in manufacturing were assigned manufacturing 1 (or Mf 1) rating, over 2SD a Mf 2 rating and over 3SD a Mf 3 rating. Likewise, similar figures were worked out for each activity groups.

Table 12.3 gives the mean and standard deviations in percentages for the nine activity groups used by Nelson. From the table, if a city is classed as Pf 2, it means that it has 22.87 percent or more but less than 28.76 percent of its labour force employed in professional services. By this procedure, a number of cities were classified in more than one activity or could not be classified in any of the mentioned nine activity groups. Such cities were termed as diversified (D).

Table 12.3: Nelson's Nine Activity Groups

	Manufacturing (Mf)	Retail Trade (R)	Professional Service (Pf)	Transportation and Communication (T)	Personal Service (Ps)	Public Administration (Pb)	Wholesale Trade (W)	Finances, Insurance and Real Estate (F)	Mining (Mi)
Average	27.07	19.23	11.09	7.12	6.20	4.58	3.85	3.19	1.62
Standard Deviation (SD)	16.04	3.63	5.89	4.58	2.07	3.48	2.14	1.25	5.01
Average Plus 1 SD	43.11	22.86	16.98	11.70	8.27	8.06	5.99	4.44	6.63
Average Plus 2 SD	59.15	26.49	22.87	16.28	10.34	11.54	8.13	5.69	11.64
Average Plus 3 SD	75.19	30.12	28.76	20.86	12.41	15.02	10.27	6.94	16.65

(Source: Nelson, H.J (1955), A Service Classification of American Cities, Geography, Vol.31, pp.195)

John Webb in 1959 used two types of indices for determining the functional classification of urban centres in Minnesota (USA) --- the functional index and the specialisation index. According to him, the ratio of the local functional percentage to the mean percentage of all the towns in an urban complex was the best way of measuring the employment of an urban centre.

The functional indices used by Webb was calculated as-- P

Where, P = the percentage of employed population in a function.

Mp = the mean employment in the function in the towns of the urban complex.

For finding out the specialisation index, the total of the functional indices of a town was divided by 100. Hence, the specialisation index for a town with a complete series of mean employment percentages would be 1.00. The more an index approaches 1.00, the lesser will be the degree of specialisation. Based on specialisation index, Webb distinguished seven categories of urban centres ranging from least to the most specialised. The values of the specialisation index for the seven groups were in the order of 1.10, 1.20, 1.40, 1.80, 2.60, 4.20 and above.

A number of techniques measured the surplus proportion of employment in urban centres for their functional classification. In this respect, the studies of Mattila and Thompson (1955) and Alexanderson (1956) are worth mentioning. They simply calculated an index of surplus workers over the national or regional average and on the basis of the ratio of functional surplus to total surplus employment of an urban centre, they presented a new technique of functional classification of towns.

SAQ I

Fill in the blanks with suitable words:

a. Aurousseau's functional classification may be grouped under ---------- methods.

b. ---------- implies that only above this level employment becomes distinctive as compared to other urban centres.
c. Nelson's functional classification scheme was published in the journal ----------.
d. Mattila and Thompson used an index of ---------- for their functional classification technique.

12.3 FUNCTIONAL CLASSIFICATION OF URBAN CENTRES

Urban centres may be classified on the basis of several attributes like site and situation, origin and stages of growth, population size, functions and so on. We have already discussed these to some extent in Unit 10. Of all the classifications of urban settlements, the one based on their functions is generally considered more realistic and meaningful because it is in respect of economic activities that urban centres may vary considerably from each other. However, as urban centres grow in size, they become more and more complex and multifunctional. Nonetheless, urban centres have one or more functions which give them their distinctive characteristics and it is on these that they are classified on functional basis. From the earliest times, chorographical works always included the description of the functions performed by towns that had the implication that towns can be classified by virtue of their functions. With increasing diversity of town functions following the industrial developments of the eighteenth and nineteenth centuries, such descriptive classifications became more frequent and elaborate (Carter, 1975)

The major functional categories of urban centres and their general characters are discussed below:

Administrative Towns: As the name suggests, administration is the dominant function of these towns. These towns are the headquarters from where any country, state, district or any other specific territories are being administered. Hence, the administrative towns may be national capitals, state capitals, district headquarters, sub-divisional headquarters etc. Since public administration is the basic function of the administrative towns, they contain all the government offices, public buildings, residences of ministers, bureaucrats etc. New Delhi, Moscow, London, Washington D.C, Jaipur (Rajasthan), Kolkata (West Bengal), Mumbai (Maharashtra) etc. are examples of administrative towns.

Industrial Towns: It is a well-established fact that industrialisation and urbanisation go hand-in-hand. This is exemplified by the developed countries of the West. Manufacturing and production of goods and commodities is the main function of manufacturing towns. Therefore, manufacturing industries acts as centripetal forces for the growth of these towns. The scale and types of industries determine the size and structure of the manufacturing towns. The major share of the working population is engaged in different manufacturing activities and the industries operating in such towns drive the urban economy. Such urban centres are generally well connected by rail-road network to the

other parts of the country e.g. Chicago, Detroit, Glasgow, Shanghai, Jamshedpur, Bokaro and Bhilai.

Commercial Towns (Trade Centres): The main function of any trade centre is the collection and distribution of commercial goods. Hence, these towns are well supported with transportation systems so that the collection centres and distribution centres can be connected. These towns are again of different categories like market towns, financial towns and sea ports.

Market towns have a wide range of shops, stores, warehouses etc. These towns are usually involved in retail as well as wholesale trade e.g. Kanpur, Ludhiana, Indore, Bhopal etc.

The main function of ***financial towns*** is obviously related to finance. Hence, financial houses, banks, stock markets and commercial agencies are characteristic of these towns e.g. Mumbai is the financial capital of India.

Seaports are the most important commercial centres since they perform the function of export and import that are directly related to trade. Some ports serve as entrepots and thus have large warehouses and trading companies e.g. New York, Amsterdam, Cape Town, Lisbon, Sau Paulo.

Transport Towns: These urban centres predominantly perform the function of transport and communication. Hence these towns generally develop at the convergence of roads (highways) or at railway junctions. San Francisco, Paris, Berlin, Santiago, Sydney are important transport cities of the world.

Mining Towns: Mining towns are involved in the mining of precious metals like gold and silver, minerals like iron ore (haematite), aluminium ore (bauxite), copper etc or energy resources like crude oil, natural gas or coal. So the mining towns are normally located in proximity of the places where these resources are extracted. Examples of mining towns are Hunnan, Shanshi, Kirkuk, Kalgoorlie, Raniganj, Jharia, Kolar, Shimoga etc.

Educational Towns: The dominant function of these towns are related to education and training. All other activities of these towns are also somehow related to educational activities. Such towns generally have one or more universities. In that case, they are known as ***university towns***. The educational towns also have other higher education centres like colleges, medical colleges, engineering colleges, training institutes etc. Major share of the population in these towns is constituted of teachers and students. Therefore, the population of these towns drastically reduces during holidays or closing time of the educational institutions. Examples of these towns are Oxford, Cambridge, Harvard, Shantiniketan, Aligarh, Pilani, Amravati etc.

Religious Towns: Religious towns generally develop at holy and religious places or pilgrimages and their existence is entirely based on their religious significance. At present, there are several religious towns across the globe that are related to some religious faith or the other. Accordingly, such towns may be characterised by temples, mosques, churches, gurudwaras etc. They may be periodically visited by vast crowds sometimes travelling from long distances e.g. Kashi, Dwarka, Haridwar, Mecca and Vatican City.

Military Towns (Defence Centres): Such towns, as the name suggests, are primarily concerned with defence or military services. Hence, they are usually situated near places of strategic importance. In many military towns, there is a clear-cut division of land between military and civil authorities. For security purposes, this division is made and so the military campus is situated either at a little distance from the main town or at one corner of the town. Military towns are characterised by cantonments, barracks, airfields, training areas for the armed forces. Examples of such towns are Ambala, Meerut, Jodhpur, Port Blair, Aden, Gibralter etc.

Resorts and Recreation Towns: Resorts and recreation towns are those which cater to the recreational needs of the people. Such towns are thus, located near some hot springs with health benefits, hill stations, seaside or places having historical monuments, sports facilities, national parks or places with attractive scenery. These towns have several hotels to accommodate the visitors or tourists as well as a wide range of shopping facilities. In addition, there may be other entertainment facilities like cinemas, night clubs, children's park etc. e.g. Geneva, Los Angeles, Srinagar, Pahalgam, Gulmarg, Manali, and Darjeeling.

Diversified Towns: Diversified towns are those which are multifunctional but there is absence of any one particular dominant function. Such type of towns has already been mentioned about while discussing Harris' or Nelson's functional classifications in the previous sections of this Unit. In general, the large cities around the world like New York, Chicago, Kansas City, Mumbai, New Delhi, and Hyderabad may be included in the list of diversified urban centres.

SAQ 2

a. Government offices, residences of ministers are bureaucrats are characteristic of ---------- towns.

b. Seaports are a type of ---------- towns.

c. Shantiniketan is an example of ---------- towns

d. ---------- towns are generally situated away from the main town or at one corner of the town.

12.4 FUNCTIONAL TYPOLOGY OF VILLAGES

In simple words, a village or a rural settlement is everything that is not urban. However, one village may not be the same as the other and may vary not only in population size, but also in their locations, site and situations, accessibility, natural assets and even urbanisation level etc. Though rural areas are traditionally involved in primary activities, yet with increasing population, the utilised agricultural areas i.e. the rural surface used to perform agricultural production or any other primary activity gradually decreases only to be replaced by other non-primary functions.

According to **Wilkin** (2005), the functions of rural areas can be categorised into the following types:

Environmental functions related to the use of natural assets for production purposes and for the human community (i.e. air, water, soil, timber, animals etc.)

Economic functions involving both commercial and non-commercial activities that not only concerns agricultural production but also more differentiated economic activities like different services as well as self-supply in terms of production and consumption, fulfilling transportation needs and so on.

Social functions related to broadly-conceived living conditions of the population inhabiting the villages and concerning their satisfaction of living, educational, health and political needs.

Cultural functions concerned with the preservation and development of the cultural traditions of the villages underpinning local, regional as well as national identity.

In 2010, Blad listed the functions of villages as:

- Conservation and preservation of the landscape.
- Architecture related to land development, buildings, structure etc.
- Activities related to agricultural production such as biodiversity conservation, forest ratio enhancement, fruit farming etc.
- Culinary traditions involving traditional products and eating habits.
- Non-agricultural rural manufacture like folk products and costumes, handicrafts etc.
- Folk ceremonies and art.

Functional typology of villages can also be assessed in terms of the type of goods provided by them and hence, the type of needs they cater to. **Wilkin** lists the following types of public and substantive goods provided by villages;

Environmental goods i.e. biodiversity, rural landscape, quality of soils, water regime etc.

Economic goods i.e. food security and safety, energy security etc.

Social and cultural goods pertaining to economic and social vitality of villages, enrichment of the local culture, development of local, regional and cultural identity.

Wilkin put forward another typology of village functions as---

Green functions pertaining to management of land resources, animal rearing, biodiversity, ecology involving plants and animals.

Blue functions concerning the use of water resources, prevention of floods, and generation of water and wind energy.

Yellow functions related to cohesion and vitality of rural areas, living conditions, catering to the socio-cultural needs.

White functions concerned with food security.

The functions of rural areas could probably be classified according to some other criteria as well. The multitude of criteria follows from the diverse functions performed by villages nowadays. The functions of rural areas mentioned above exist in proportions and interdependencies and are differentiated in time and space. The performance of the functions contribute to the living and working conditions of villages, the condition of the natural environment, socio-economic structure, settlement networks and technical and social infrastructures.

Box 12.1: Functional Typology of Villages in India

The Indian villages can be classified into *three* functional groups, namely,

Dormitory Villages---These are villages which offer no services and only consist of the houses of people engaged in primary activities.

Rural Service Centres---These are villages where some people are engaged in tertiary activities and where some permanent shops and periodic markets are set up. Population size in such villages increases with decreasing distance from the nearby urban centre since such villages are normally closest to the major towns of the region.

Rural Administrative Centres---These are villages where block development offices, panchayat offices or land revenue offices are located.

SAQ 3

a. What is meant by yellow functions of villages?

b. What do you mean by dormitory villages?

12.5 FUNCTIONAL LANDSCAPE

Functional landscape of a settlement is basically the outcome of the different economic activities performed by its inhabitants and simply means the land use pattern of the settlement. The first land use or land utilisation survey was organised and directed by the famous British geographer, L. Dudley Stamp during the 1930s. Therefore, the study of the land use system is regarded as a great contribution of L.D Stamp. Later, it was adopted by different countries of Europe, the United States, India etc.

12.5.1 Functional Landscape of Rural Areas

The functional landscape or the land use of any rural settlement or village may be described as the functional zones in and around it. Different functional zones may be delineated from the inhabited part of any rural settlement outwards to its boundary (Fig. 12.1). They may be described as---

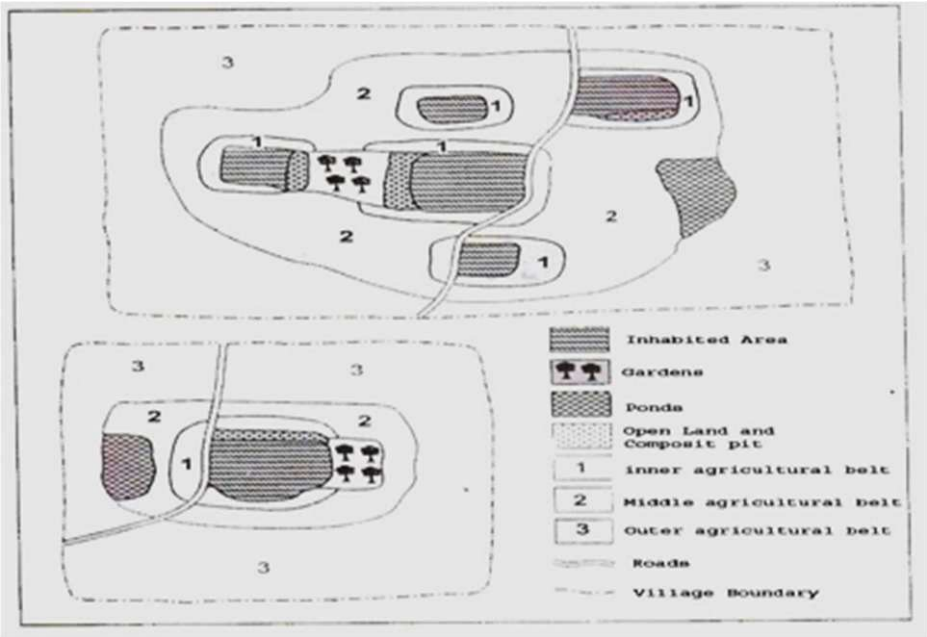

Fig. 12.1: Functional Morphology of Villages.

Inhabited Area--- This represents the built-up area which is mainly used for residential purposes. It comprises of streets and dwellings and may be surrounded by gardens, open lands or agricultural lands etc. In India, the dwellings of different social classes and castes are generally located in different parts of the village.

Uncultivated Land including Gardens--- This is usually in the form of a contiguous zone around the inhabited area and generally consists of community or common land, compost pits, wells, gardens, playgrounds etc.

Inner Agricultural Land--- This is normally the zone of intensive cropping used for multiple cropping in a year. The land is used to grow vegetables, flowers, fodder etc. This zone is situated around the inhabited area and the uncultivated lands.

Middle Agricultural Land--- This is an intermediate area between the zones of inner agricultural land and the outer agricultural land. It is used for the purpose of double cropping to grow grains or some commercial crops.

Outer Agricultural Land--- The outer or marginal agricultural land is situated at the farthest distance from the inhabited area at the margin of the village. This is generally the less productive part and in some cases may also contain forested lands or wastelands. This zone provides one or two crops or other items in a year.

12.5.2 Functional Landscape of Urban Areas

Urbanisation is no doubt the process by which the rural agrarian landscape changes to industrial commercial landscape. Urban functional landscape develops with the urban sprawl and expansion of the urban area. The study of urban functional landscape is simply the identification of various land uses within an urban settlement. Urban landscape comprises of the location of different activities in an urban centre and their levels of spatial accumulation i.e. their intensity and concentration. Fig. 12.2 depicts that residential areas in

a town or city are at some distance from the centre since centres are most crowded. Light manufacturing are generally near the city centre while heavy manufacturing away from the city. Since markets require a dense consumer base, so markets are usually close to the city centre.

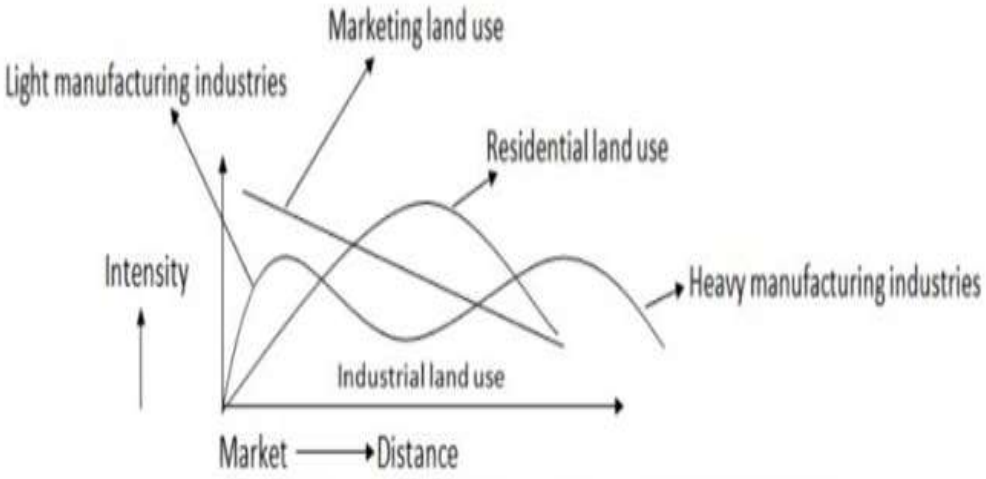

Fig. 12.2: Functional Landscape of Urban on the basis of Distance and Intensity.

The urban landscape may have different functional zones that can be categorised under the following heads;

- Commercial.
- Residential.
- Administrative.
- Educational.
- Industrial.
- Religious.
- Cultural.
- Parks and Open Spaces.
- Other Service Areas.

Commercial or Market Areas are generally located in proximity of residential areas for the reasons mentioned above. It is one of the most important urban functions. Commercial areas may be classed into *five* categories. They are:

The Central Business District (CBD) --- This is the most important part of any city and important of all the commercial areas. It is generally situated at the centre or heart of the city. The CBD is also known as the Central Traffic District being the nodal point of several transportation routes or the central commercial district for being the focal point of maximum commercial activities within the city. It is immensely crowded during the daytime and is characterised by high rises and multi-storeyed buildings.

Outlying Business Centre --- As an urban centre grow in size, several other commercial areas also develop in addition to the CBD that are almost similar to it. Their numbers depend on the expanse of the urban centre.

Principal Business Thoroughfare --- These are commercial or market areas that develop along the major transport routes converging at the CBD.

Neighbourhood Business Street --- Sometimes commercial areas develop along the roads in vicinity of the residential areas of an urban settlement to cater to their day-to-day needs. Such areas constitute the neighbourhood business street.

Isolated Store Cluster --- These are generally the shops and stores that are located within the residential areas and thus, are few in number. They are small shops with lesser variety of products available which are sold at comparatively higher prices than the market areas.

Residential Areas are next in importance within an urban landscape after commercial areas. They obviously fulfill the residential needs of the people inhabiting the urban areas and comprises about a third of the total area in general. However, the composition and expanse of residential areas changes with time. The location of residential areas depends on a host of factors like availability of amenities, rent, cost and preferences and purchasing capacity of the residents. Normally low class residences are located near the city centre whereas high class residences are located farthest away from the city centre. This is because the city centres provide maximum job opportunities and the people belonging to the low income groups working in the city centre prefer to curtail on the travel cost while people from high income groups prefer clean and pollution free environment away from the city centre. The residential areas can be divided into two belts--- the inner belt surrounding the CBD and the outer belt near the margin. The density of population and houses decreases from the inner to the outer belt. On the basis of socio-economic status, residential areas may be grouped as *high class, upper middle class, lower middle class and low class*. On the basis of building structure residences may be classified as *bungalows, multi-storeyed, single-storeyed, slums* etc.

Administrative Areas: For the maintenance of law and order within an urban centre or for its effective administration, administrative offices are present in it that constitutes the administrative areas. In India, administrative offices can be categorised into four groups--- national government offices, state government offices, district administrative offices and local bodies. The local bodies catering to the local inhabitants are in general situated in the inner and middle part of the urban centre while rest of the offices may be located at the outskirts or at the margin. Sometimes, residences of the people working in these offices are found adjoining the office buildings.

Educational Areas: Any urban area may have multiple educational institutions distributed across it. They may range from primary, secondary, graduate or post graduate institutions, technical education or business education institutions. Primary institutions do not need larger space and may be found in any locality. However, high class educational institutions having various extra-curricular activities may require much space and are thus found near upper middle class or high class residences away from the city centre. Educational institutions having residential campus also require larger space and thus are normally found at the outskirts of the urban area.

Manufacturing Area: The manufacturing areas have a great impact on the functional landscape of urban areas. They may comprise of heavy

manufacturing, light manufacturing and cottage industries. Their locations have already been discussed earlier. In recent times, most of the bigger urban centres have spaces allotted for establishing industrial estates.

Religious Areas: Almost all urban places have religious buildings like temples, mosques, churches and so on. In fact, some town or city may themselves develop as religious towns. Religious places are usually close to residential areas and may also have shops and other facilities nearby.

Cultural Areas: This includes the different cultural institutions and recreational facilities like clubs, cinema halls, theatres etc. They are spread throughout the urban area.

Parks and Open Spaces: Urban green and open spaces like parks are especially effective in controlling pollution and minimising urban temperatures. They are covered with vegetation of all kinds and may also have water bodies like ponds, lakes etc. These areas not only promote physical well-being of the residents but may also provide psychological relaxation and stress alleviation as well as social cohesion. Such spaces may be found anywhere in the urban areas but preferably near residential areas.

Other Services: This includes railway stations, bus terminus, telephone exchange and broadcasting stations, fire stations, post offices, hospitals etc. Hospitals are usually located in the middle or outskirts of the town or city. Railway stations or bus terminus are located in the middle of the city though with increasing population, they may be relocated at the margin of the urban areas. Fire stations are also situated at the middle of the city for speedy delivery of service. Telephone exchanges or any broadcasting stations may also be located at the middle of the town or city while post offices may be found in any locality.

SAQ 4

a. Who first organised the land utilisation survey?
b. What is the CBD?

12.6 FUNCTIONAL STRUCTURE OF TOWNS IN INDIA

The range of economic activities performed by an urban centre covers a wide spectrum of primary, secondary and tertiary activities. In general, there is a tendency among scholars to exclude primary economic activities like mining, agriculture or fishing from urban economic activities. In the Indian context however, primary activities are very much characteristic of urban centres. Almost a third of India's urban centres may have agriculture as a relatively dominant activity. However, employment in agriculture is significant only in small towns whereas in cities, secondary and tertiary activities are predominant.

On the basis of the technique developed by foreign scholars, several Indian scholars have also attempted to functionally classify towns and cities. The

occupational data provided by the Indian Census are commonly utilised for the functional classification of Indian towns. According to the Indian Census, towns and cities of the country may be classified into five functional categories---primary activities, industry, trade and commerce, transport and services. For each of these categories, the percentage of workers to the total workers is calculated and if the percentage of workers in any of the aforesaid categories comprise 40 percent or more of the total workers then the urban centre may be recognised as monofunctional. If the next dominant function is considered and the combined percentage of workers in both the categories is 60 percent or more then such towns are designated as bifunctional. In the rest of the cases where the sum of any two categories does not yield 60 percent, then such towns are considered as multifunctional (Maurya, 2014).

Attempt to find out the functional structure of Indian cities was first made by Amrit Lal using 1951 Census data. The study included 67 one lakh cities but suffered from a number of methodological deficiencies. It did not even list the 67 cities that were included in the study while categorising the functional groups. For determining the level of functional specialisation of the cities, Lal used the median as a tool and worked out four arbitrary positive values for measuring the specialisation in major industrial categories. Apart from this, Janaki (1954) grouped the towns of Kerala into five functional categories as administrative centres, commercial and industrial towns, agricultural, collection and distribution centres or market towns, temple towns and plantation towns. The classification was based on the study of the impact of physical and economic factors on the functions and growth of towns but was of a descriptive nature. Prakash Rao in his Presidential address at the Council of Geographers in 1962 presented his ideas about the functional organisation of towns using the least square linear regression method in which the two axes are drawn---one showing the population size of towns and the other the percentage of workers in a particular function to total workers. A line of central value was used to determine functional specialisation. Rafiullah in 1965 presented a new scheme to study the functional structure of towns that was based on the maximum positive deviation method. It was basically an adaptation and modification of the minimum deviation method used to determine crop combination by Weaver. In this method, unlike the standard deviation, the differences of actual values were calculated from a middle value of the theoretical standard. Using the Census data of 1961, Ganguli presented a functional classification of 250 Indian cities having a population of 50,000 and above. He used Nelson’s standard deviation method which we have discussed earlier in this Unit for the purpose. In 1965, Qazi Ahmad studied the characteristics of 102 Indian cities with one lakh or more population using multivariate analysis. However, he observed that only 10 cities actually exhibited over 70 percent correlation among the 62 variables considered by him.

However, the most widely accepted method to explain the functional structure of Indian towns and cities is the one that was designed by Asok Mitra in 1964. He used the 1961 Census data that provided for nine categories of workers for all urban centres. The categories were namely,

i. Cultivators
ii. Agricultural Labour

iii. Forestry, Fishing, Plantations, Mining and Quarrying etc.
iv. Household Industry
v. Manufacturing other than Household Industry
vi. Construction
vii. Trade and Commerce
viii. Transport, Storage and Communication
ix. Services.

First of all seven occupational categories (from Categories III to IX) were grouped in three broad categories to derive three major functional types (Table 12.4).

Table 12.4: Occupational categories and their criteria for classification

Categories	Criteria
Manufacturing Towns	When the percentage of workers in the Categories III, IV, V and VI put together is greater than the percentage of workers in Categories VII and VIII put together or Category IX.
Trade and Transport Towns	When the percentage of workers in Categories VII and VIII put together is greater than the percentage of workers in Category IX or Categories III, IV, V and VI put together.
Service Towns	When the percentage of workers in Category IX is greater than the percentage of workers in Categories III, IV, V and VI put together or Categories VII and VIII put together.

The manufacturing towns and the trade and transport towns were further categorised in the following sub-groups (Table 12.5).

Table 12.5: Categorization of manufacturing and trade and transport town and their criteria for classification

Categories	Sub-Categories	Criteria
Manufacturing Towns	Mining and Quarrying, Livestock, Forestry, Fishing or Plantation Towns	Towns in which the percentage of workers in Category III is greater than in Categories IV, V and VI considered individually.
	Artisan Towns	Towns in which the percentage of workers in Category IV is greater than in Categories V, VI and III considered individually.
	Manufacturing Towns	Towns in which the percentage of workers in Category V is greater than in Categories VI, III and IV considered individually.
	Construction Towns	Towns in which the percentage of workers in Category VI is greater than in Categories III, IV and V considered individually.
Trade and Transport Towns	Trade Towns	Towns in which the percentage of workers in Category VII is greater than in Category VIII.
	Transport Towns	Towns in which the percentage of

		workers in Category VIII is greater than in Category VII.

Thus, in total seven types of towns were identified. To determine the degree of specialization in the three major functional types, a ***triangular method*** (Figure 12.3) was adopted in which the number of workers in each of these three groups was expressed as a percentage of the total. This means that the values of all the three types added up to 100. The values of the three groups were then plotted in an equilateral triangle in which the perpendiculars drawn to each side of the triangle were directly proportional to the percentage of workers in each of the three types.

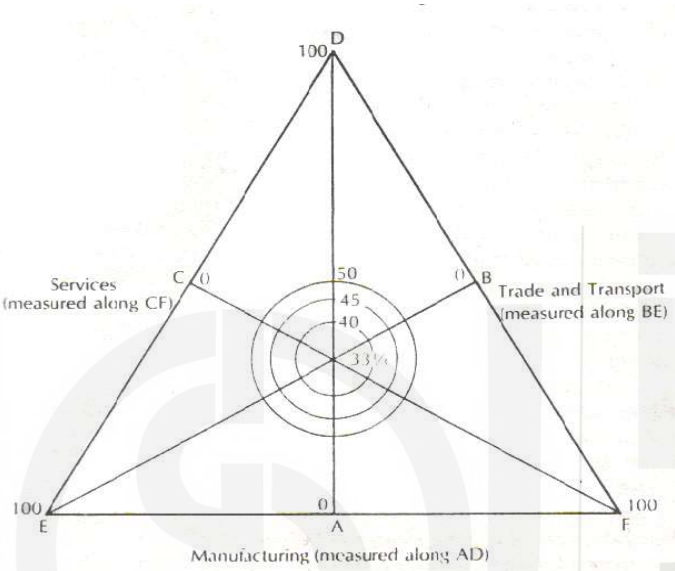

Fig. 12.3: Asok Mitra's Triangular Method for Measurement of Degree of Specialization of Functions.

The in-centre of the triangle represented a town in which the percentage of workers in each of the three groups was exactly the same i.e. $33^{1/3}$. It depicted a town with no functional specialization. Three circles were drawn from the in-centre at distances of $6^{2/3}$, $11^{2/3}$ and $16^{2/3}$ units to differentiate *four* levels of specialization. Distance from the in-centre suggested increasing tendency for specialization. Mitra designated the different degrees of specialization as follows (Table 12.6)

Table 12.6: Degree of Specialisation and Location in Triangles

Degree of Specialisation	Code	Location in Triangle
Predominant Function Highly Accentuated	PFHA	Outside the Outer Circle (Third Circle)---dominant function has over 50% workers.
Predominant Function Accentuated	PFA	Between the Second and Third Circles---one group of workers is between 45%--50%
Functions Moderately Diversified	FMD	Between the First and Second Circles---one group of workers is between 40%--45%
Functions Highly Diversified	FHD	Inside the Inner Circle (First Circle)---no group of workers constitute more than 40%

The second classification presented by Mitra was rather complicated and involved quantitative techniques like factor and cluster analysis. However, the result was less satisfactory than his original simpler classification.

So far as the Indian urban centres are concerned, most of them exhibit diversified economic base with no clear specialization. Nevertheless, it is observed that the manufacturing or trade and transport towns appear to be the most dominant types (Box 12.2) in the functional structure of Indian towns and cities. But diversified urban centres are most common. In fact, the Indian urban system is basically a system of diversified towns and cities.

Box 12.2: Functional Structure of Indian Towns and Cities by Asok Mitra

Asok Mitra classified 2528 urban centres in India that were included in the 1961 and 1971 Censuses. Interestingly, of these 736 were agricultural towns. Of the remaining 1792 non-agricultural towns, 655 were classified as manufacturing towns, 708 as trade and transport and 429 as service towns.

SAQ 5

a. What are bifunctional towns?
b. Who made the first attempt to present the functional structure of Indian cities?

12.7 SUMMARY

Functional classifications of settlements dealing with the structure and distribution of settlement functions or the economic activities they perform are abounding in geographical literature. But the main problem associated with functional classification is assigning some group to each individual settlement. Therefore, the ball always lies in the court of those who are handling the job. Hence, to some extent some subjectivity is all-pervading. Nonetheless, it becomes customary to review the preceding functional classification of geographers. The methods involved in the functional classification of settlements may be categorised as--qualitative methods, qualitative-cum-quantitative methods and quantitative methods. Qualitative Method simplifies the initial stage in the functional analysis of settlements. As such these methods constitute the empirical and non-statistical techniques. The name of Aurousseau is perhaps the first to be mentioned in this category. The qualitative methods of functional classification suffer from the general criticism that they are purely based on the personal observations of the scholars and may differ from one to another. The qualitative-cum-quantitative methods mark a transitional stage between the earlier qualitative methods and the later quantitative or statistical methods. In this, occupational data have been used since a clear-cut link may be found between settlement functions and occupational groups. Though data are used for classifying the settlements particularly the urban ones, the qualifying minimum limits or the percentages on the basis of which functional classifications are done are often selected arbitrarily by the scholar. The most widely accepted classification in this category is the one put forward by Chauncy D. Harris. He relied on two sets of

information---occupation figures and employment figures. The quantitative methods involves the use of pure statistical techniques whether it be the location quotient, positive deviation from the mean, the standard deviation method employed by Nelson, the functional index and the specialisation index or the index of surplus workers.

Of all the classifications of urban settlements, the one based on their function is generally considered more realistic and meaningful.

Even villages may not be the same and may vary not only in population size, but also in their locations, site and situations, accessibility, natural assets and even urbanisation level etc. Though rural areas are traditionally involved in primary activities, yet with increasing population, the rural surface used to perform agricultural production or any other primary activity gradually decreases only to be replaced by other non-primary functions. The functions of rural areas can be categorised into environmental, economic, social and cultural functions. The functions of villages may be listed as---conservation and preservation of the landscape, architecture related to land development, buildings, structure etc., activities related to agricultural production such as biodiversity conservation, forest ratio enhancement, fruit farming etc., culinary traditions involving traditional products and eating habits, non-agricultural rural manufacture like folk products and costumes, handicrafts etc. and folk ceremonies and art. The type of goods provided by the villages may be grouped as environmental, economic and social and cultural goods. Another typology of village functions is green functions, blue functions, yellow functions and white functions.

Different functional zones may be delineated from the inhabited part of any rural settlement outwards to its boundary. The inhabited area represents the built-up area which is mainly used for residential purposes. It comprises of streets and dwellings. Uncultivated lands usually form a contiguous zone around the inhabited area and generally consist of community or common land, compost pits, wells, gardens, playgrounds etc. The inner agricultural land is normally the zone of intensive cropping used for multiple cropping in a year. This zone is situated around the inhabited area and the uncultivated lands. The middle agricultural land is an intermediate area between the zones of inner agricultural land and the outer agricultural land. It is used for the purpose of double cropping. The outer or marginal agricultural land is situated at the farthest distance from the inhabited area at the margin of the village. This is generally the less productive part and in some cases may also contain forested lands or wastelands.

Urban functional landscape develops with the urban sprawl and expansion of the urban area. The study of urban functional landscape is simply the identification of various land uses within an urban settlement. Urban landscape comprises of the location of different activities in an urban centre and their levels of spatial accumulation i.e. their intensity and concentration. The urban landscape may have different functional zones that can be categorised as---commercial, residential, administrative, educational, industrial, religious, cultural, parks and open spaces and other service areas. Residential areas in a town or city are at some distance from the centre since centres are most crowded. Light manufacturing are generally near the city

centre while heavy manufacturing away from the city. Since markets require a dense consumer base, so markets are usually close to the city centre. The Central Business District (CBD) is the most important part of any city

The range of economic activities performed by an urban centre covers a wide spectrum of primary, secondary and tertiary activities. In general, there is a tendency among scholars to exclude primary economic activities from urban economic activities. In the Indian context however, primary activities are very much characteristic of urban centres. On the basis of the technique developed by foreign scholars, several Indian scholars have also attempted to functionally classify towns and cities. The occupational data provided by the Indian Census are commonly utilised for the functional classification of Indian towns. According to the Indian Census, towns and cities of the country may be classified into five functional categories---primary activities, industry, trade and commerce, transport and services. On the basis of the percentage of workers in each of these categories to the total workers, towns may be grouped as monofunctional, bifunctional and multifunctional. The most widely accepted method to explain the functional structure of Indian cities is the one that was designed by Asok Mitra in 1964. He used the 1961 Census data that provided for nine categories of workers for all urban centres. On the basis of the seven occupational categories of the Census, towns were categorised as manufacturing, trade and transport and service towns. The first two were further sub-grouped into six subtypes. Mitra used a triangular method to depict the functional specialization of towns in India.

12.8 TERMINAL QUESTIONS

1. Explain Chauncy D. Harris' method of functional classification.
2. Attempt a classification of urban centres on the basis of their function.
3. Discuss in detail the functional typology of villages.
4. Describe the functional landscape of a rural area.
5. Explain Asok Mitra's method of determining the functional structure of Indian cities.

12.9 ANSWERS

Self-Assessment Questions (SAQ)

1. a. Qualitative b. Diagnostic Ratios c. Geography d. Surplus Workers
2. a. Administrative b. Commercial c. Education d. Military
3. a. Yellow functions of the villages are related to cohesion and vitality of rural areas, living conditions, catering to the socio-cultural needs.

   b. Dormitory villages are those which offer no services and only consist of the houses of people engaged in primary activities.
4. a. L. Dudley Stamp.

b. The CBD is the most important part of any city. It is generally situated at the centre or heart of the city. The CBD is also known as the Central Traffic District being the nodal point of several transportation routes or the central commercial district for being the focal point of maximum commercial activities within the city.

5. a. If the two most dominant functions of a town are considered and the combined percentage of workers in both the categories is 60 percent or more then such towns are designated as bifunctional.

   b. Amrit Lal.

Terminal Questions

1. The methods involved in the functional classification of settlements may be categorised as--qualitative methods, qualitative-cum-quantitative methods and quantitative methods. The most widely accepted classification employing qualitative-cum-quantitative methods is the one put forward by Chauncy D. Harris. He presented his A Functional Classification of Cities in the United States that was published in 1943. Harris was quantitatively able to identify the dominant function from the multifunctional character of the cities. He devised a scale of reference from his study of 984 towns (with a population of 10,000 and above) in the United States on the basis of data provided by the 1930 Census. Harris relied on *two* sets of information---occupation figures and employment figures. Of these two, preference was given to the second set to avoid the inclusion of informal industrial workers such as carpenters and plumbers. He identified nine principal categories of towns, namely, manufacturing cities (with two subtypes), retail centres, diversified cities, wholesale centres, transportation centres, mining towns, university towns, resorts and retirement towns and other types of cities (including political).

2. Of all the classifications of urban settlements, the one based on the activities they perform (known as their function) is generally considered more realistic and meaningful. Administrative towns are the headquarters from where any country, state, district or any other specific territories are being administered. Manufacturing and production of goods and commodities is the main function of manufacturing towns. The main function of any commercial town is the collection and distribution of commercial goods. These towns are again of different categories like market towns, financial towns and sea ports. Transport towns predominantly perform the function of transport and communication. Mining towns are involved in the mining of precious metals, minerals or energy resources. The dominant function of educational towns are related to education and training. Educational towns having universities are called university towns. Religious towns generally develop at holy and religious places or pilgrimages and their existence is entirely based on their religious significance. Military towns are primarily concerned with defense or military services. Resorts and recreation towns are those which cater to the recreational needs of the people. Diversified towns are those which are multifunctional but there is absence of any one particular dominant function.

3. Villages may not be the same and may vary not only in population size, but also in their locations, site and situations, accessibility, natural assets and even urbanisation level etc. Though rural areas are traditionally involved in primary activities, yet with increasing population, the rural surface used to perform agricultural production or any other primary activity gradually decreases only to be replaced by other non-primary functions. The functions of rural areas can be categorised into environmental, economic, social and cultural functions. The functions of villages may be listed as---conservation and preservation of the landscape, architecture related to land development, buildings, structure etc., activities related to agricultural production such as biodiversity conservation, forest ratio enhancement, fruit farming etc., culinary traditions involving traditional products and eating habits, non-agricultural rural manufacture like folk products and costumes, handicrafts etc. and folk ceremonies and art. The type of goods provided by the villages may be grouped as environmental, economic and social and cultural goods. Another typology of village functions is green functions, blue functions, yellow functions and white functions.

4. Different functional zones may be delineated from the inhabited part of any rural settlement outwards to its boundary. The inhabited area represents the built-up area which is mainly used for residential purposes. It comprises of streets and dwellings and may be surrounded by gardens, open lands or agricultural lands etc. Uncultivated lands usually form a contiguous zone around the inhabited area and generally consist of community or common land, compost pits, wells, gardens, playgrounds etc. The inner agricultural land is normally the zone of intensive cropping used for multiple cropping in a year. The land is used to grow vegetables, flowers, fodder etc. This zone is situated around the inhabited area and the uncultivated lands. The middle agricultural land is an intermediate area between the zones of inner agricultural land and the outer agricultural land. It is used for the purpose of double cropping to grow grains or some commercial crops. The outer or marginal agricultural land is situated at the farthest distance from the inhabited area at the margin of the village. This is generally the less productive part and in some cases may also contain forested lands or wastelands. This zone provides one or two crops or other items in a year.

5. The most widely accepted method to explain the functional structure of Indian cities is the one that was designed by Asok Mitra in 1964. He used the 1961 Census data that provided for nine categories of workers for all urban centres, namely, cultivation (I), agricultural labour (II), forestry, fishing, plantations, mining and quarrying etc. (III), household industry (IV), manufacturing other than household industry (V), construction (VI), trade and commerce (VII), transport, storage and communication (VIII) and services (IX). First of all seven occupational categories (from Categories III to IX) were grouped in three broad categories to derive three major functional types----manufacturing, trade and transport and service towns. The manufacturing towns and the trade and transport towns were further categorised in the sub-groups---mining and quarrying, livestock, forestry, fishing or plantation towns, artisan towns, manufacturing towns, construction towns, trade towns and transport towns. Mitra used a

triangular method to depict the functional specialization of towns in India amd identified four classes of specialization---predominant function highly accentuated (PFHA), predominant function accentuated (PFA), function moderately diversified (PMD) and function highly diversified (FHD).

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GLOSSARY

Behavioural Theories of Settlements : Behavioural theories of settlements attempt to explain the existing patterns of settlements in a region.

Compact settlement : In this type of settlement, the houses are close to each other and inter-building spaces are small.

Dispersed Settlement : In this type of settlement, buildings are spread over a large area, and inter building spaces are large.

Dry-point settlements : These are the sites that avoided the risk of flooding. For examples, in marshy areas, higher ground that is little away from water body can prove to be a favourable site.

Ekistics : The scientific study of human settlements, drawing from several disciplines, including architecture, city planning and social sciences.

Morphology of settlements : It refers to the layout or the internal structure of the settlement.

Neolithic Period : The stage or cultural evolution or technological development characterised by the use of stone tools and the existence of settled villages dependent on domesticated plants and animals.

Normative Theories of Settlements : Normative theories of settlements are not concerned about the existing patterns rather attempt to define an ideal system of settlements.

Patterns of settlements : It means the geometrical shape that the houses in a settlement acquire. Pattern can be- linear, rectangular, square, circular, amorphous, T-shape, L-shaped, star-shaped etc.

Site : It refers to the actual location of the village. It is related to the physical surrounding.

Situation : It refers to the culture, economy and political set-up of the settlement. Therefore, situation covers the socio-economic aspects of the settlement.

Spur-line settlements : Settlements those are located in valleys in mountainous and hilly areas.

Types of settlements : It refers to the nearness of the houses in an area. There are four types- compact, semi-compact, dispersed and farmstead.

Wet-point settlements : These are the sites close to a supply of water. For example, in desert areas, oasis or any other source of water acts as a favourable site for settlement.

Megalopolis : The megalopolis is defined by its poly-nuclear characteristic, where, large cities are joined by a

continuous chain or complex of cities.

Conurbation : The term invented by Patrick Geddes to describe constellations of cities sprawling together.

The Central Business District : It is the central area of the city. In common parlance, it is known as the “downtown”. It is primarily characterised by retailing of goods and services, office activities and major service providences.

Slum : UN-HABITAT defines a slum household as a group of individuals living under the same roof in an urban area who lack one or more of the following: (i) Durable housing of a permanent nature that protects against extreme climate conditions; (ii) Sufficient living space which means not more than three people sharing the same room; (iii) Easy access to safe water in sufficient amounts at an affordable price; (iv) Access to adequate sanitation in the form of a private or public toilet shared by a reasonable number of people; (v) Security of tenure that prevents

City Region : It is that region which has functional links with the city, the major functions being work, dwelling, recreation and transport.

Rural-Urban Fringe : The rural-urban fringe is the transitional zone in which the influence of the urban centre decreases categorically, while the rural characteristics take over.

Urban Sprawl : Urban sprawl refers to the pace of land conversion to urban use and magnitude of areal expansion of the city.